ANNUAL REPORT

OF THE

DEPARTMENT OF THE INTERIOR

FOR THE

Fiscal Year ending March 31, 1917

PRINTED BY ORDER OF PARLIAMENT

OTTAWA
J. DE LABROQUERIE TACHÉ
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1918

[No. 25—1918.]

To His Excellency the Duke of Devonshire, K.G., P.C., G.C.M.G., G.C.V.O., etc., etc.,
Governor General and Commander in Chief of the Dominion of Canada.

MAY IT PLEASE YOUR EXCELLENCY:

The undersigned has the honour to lay before Your Excellency the report of the transactions of the Department of the Interior for the fiscal year ending March 31, 1917.

Respectfully submitted,

W. J. ROCHE,
Minister of the Interior.

OTTAWA, September 1, 1917.

TABLE OF CONTENTS.

PAGE.

Report of Deputy Minister 1

PART I.—DOMINION LANDS.

Report of the Commissioner 3
" " Chief Inspector of Dominion Lands Agencies 4
" " Inspector of Dominion Lands Agencies, Calgary 5
" " " " " Brandon 10
" " Agent of Dominion Lands, Battleford 16
" " " " " Calgary 17
" " " " " Dauphin 18
" " " " " Edmonton 19
" " " " " Grande Prairie 20
" " " " " High Prairie 21
" " " " " Humboldt 22
" " " " " Kamloops 23
" " " " " Lethbridge 24
" " " " " Maple Creek 25
" " " " " Medicine Hat 26
" " " " " Moosejaw 27
" " " " " New Westminster 28
" " " " " The Pas 29
" " " " " Peace River 30
" " " " " Prince Albert 31
" " " " " Red Deer 32
" " " " " Revelstoke 33
" " " " " Saskatoon 34
" " " " " Swift Current 35
" " " " " Weyburn 36
" " " " " Winnipeg 37
" " " " " Yorkton 38
" " Mining Lands and Yukon Branch 39
" " Inspector and Engineering Division, M.L. and Y 51
" " Administrator of the Yukon Territory 51
" " Comptroller of the Yukon Territory 53
" " Gold Commissioner 53
" " Crown Timber and Land Agent 57
" " Assistant Gold Commissioner 62
" " Timber and Grazing Lands Branch 63
" " Crown Timber Agent, Calgary 68
" " " " " Edmonton 74
" " " " " Prince Albert 84
" " " " " Winnipeg 90
" " " " " Kamloops 97
" " " " " New Westminster 100
" " " " " Revelstoke 105
" " Chief Inspector of Crown Timber Agencies 108

PAGE.

Report of the Inspector of Ranches, Prince Albert.. 113
" " " " Calgary.. 114
" " " " Minnedosa.. 114
" " " " Moosejaw.. 114
" " " " Maple Creek.. 115
" " School Lands Branch.. 131
" " Land Patents Branch.. 138
" " The Superintending Accountant.. 115
" " Ordnance and Admiralty Lands Branch.. 158
" " Correspondence Registration Branch.. 161
" " Correspondence, Comparing and Mailing Branch.. 163

PART II.—IMMIGRATION.

Report of the Superintendent of Immigration.. 3
Report of the Chief Controller of Chinese Immigration.. 17

OPERATIONS IN EUROPE.

Report of J. Obed Smith, Assistant Superintendent of Emigration.. 18

OPERATIONS IN THE UNITED STATES.

Report of the Inspector of United States Agencies.. 20

OPERATIONS IN CANADA.

Report of the Acting Commissioner of Immigration.. 22

MEDICAL INSPECTION.

Report of the Chief Medical Officer.. 24

JUVENILE IMMIGRATION.

Report of the Chief Inspector of British Immigrant Children and Receiving Homes.. 30

PART III.—SURVEYS.

Report of the Surveyor General.. 3
No. 1. Schedule of Surveyors Employed, and Work Executed.. 21
2. Schedule showing Miles Surveyed and Cost.. 28
3. Details of Office Work.. 29

SESSIONAL PAPER No. 25

PART V.—DOMINION PARKS.

	Page
Report of the Commissioner of Dominion Parks	3
" " Chief Superintendent of Dominion Parks	12
" " Superintendent of Rocky Mountains Park	16
" " Curator of Banff Museum	28
" " Alpine Club of Canada	32
Analysis of Nationalities of Visitors to Rocky Mountains Park from April, 1916, to March 31, 1917	35
Analysis of Hot Sulphur Waters, Banff	41
Report of the Superintendent of Yoho and Glacier Parks	43
" Acting Superintendent of Revelstoke Park	47
" Superintendent of Waterton Lakes Park	50
" " Buffalo Park	55
" " Elk Island Park	58
Report of the St. Lawrence Islands Park	59
Meteorological Tables, Maximum and Minimum Temperatures, etc., Banff	61

PART VI.—FORESTRY.

Report of the Director .. 3

APPENDICES.

1. Report of the Chief of the Tree Planting Division .. 23
2. " " District Inspector of Forest Reserves for Manitoba .. 30
3. " " District Inspector of Forest Reserves for Saskatchewan .. 37
4. " " District Inspector of Forest Reserves for Alberta .. 43
5. " " District Inspector of Forest Reserves for British Columbia .. 53
6. " " Superintendent of the Forest Products Laboratories of Canada. 59

PART VII.—IRRIGATION.

Report of the Superintendent of Irrigation .. 3

APPENDIX.

Report of F. H. Peters, C.E., Irrigation and Canadian Irrigation Surveys .. 13

PART VIII.—WATER POWER.

PAGE.

Report of the Superintendent of Water Power.. 3

APPENDICES.

No. 2. Report of the Chief Draughtsman.. 9
3. " " Accountant.. 19
4. " " Chief Hydraulic Engineer.. 20
5. " " Chief Engineer, British Columbia Hydrometric Survey.. 26
6. " " Chief Engineer, Manitoba Hydrometric Survey.. 37
7. " " Chief Engineer, Alberta and Saskatchewan Power Survey. 43
8. Report on the work carried on by the Dominion Water Power Branch in co-operation with the Nova Scotia Water Power Commission.. 47
9. Report of the Chief Engineer of Reclamation.. 50

REPORT

OF THE

DEPARTMENT OF THE INTERIOR

1916-1917.

The Hon. W. J. ROCHE,
Minister of the Interior,
Ottawa.

I have the honour to submit the forty-fourth Annual Report of the Department of the Interior, for the twelve months ending the 31st March, 1917.

The past year is the best, as far as conditions in Western Canada are concerned, since the commencement of the war.

Reports from the outside offices of the department indicate that although settlement on new land may not be up to the standard of other years, still, the productiveness of existing settlement is much increased.

The revenue of the department is highly satisfactory, and shows quite a material increase over last year. Owing to the necessity for the strictest possible economy, all expenditures have been kept down to the extreme minimum, and the great efficiency maintained has been the result of the loyal co-operation of the officers of the department.

The large number of enlistments from the service of this department, both at Ottawa and outside, has meant rather an onerous increase in the amount of work carried on by those officers who have not been able to participate in the more glorious part of our national service overseas.

Nine of our patriotic boys have made the supreme sacrifice, and are now resting somewhere along the front bulwarks of the defenders of the liberties of the world.

STATEMENT showing Gross Cash Revenue received from all sources during the fiscal year ended March 31, 1917, compared with the receipts for the previous fiscal year.

Source of Revenue.	Fiscal Year 1916–17.	Fiscal Year 1915–16.	Increase.	Decrease.	Net Increase.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Dominion Lands	4,189,905 55	2,443,479 92	1,746,425 63		
School Lands	1,699,370 06	934,965 37	764,404 69		
Ordnance Lands	5,553 26	5,997 98		444 72	
Seed Grain	3,652,729 03	2,525,528 50	1,127,200 55		
Casual Revenue	15,618 26	28,002 62		12,384 36	
Registration Fees—Yukon	796 85	908 15		111 30	
Fines and Forfeitures—N.W.T.	95 00	92 50	2 50		
Fines under Immigration Act	2,089 72	2,982 71		892 99	
Chinese Immigration Revenue	140,487 00	19,389 00	121,098 00		
Sales of land, Special Account	407,125 71	398,597 70	8,528 01		
	10,113,770 46	6,359,944 45	3,767,659 38	13,833 37	3,753,826 01

SESSIONAL PAPER No. 25

STATEMENT of receipts on account of Dominion Lands Revenue for the fiscal year ended March 31, 1917, as compared with the receipts for the previous year.

Particulars.	1916-1917.	1915-1916.	Increase.	Decrease.	Net Increase.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Homestead Fees	112,110 20	170,350 00		58,239 80	
Pre-emption Fees	14,690 00	22,760 00		8,070 00	
Purchased Homestead Fees	2,660 00	2,980 00		320 00	
Improvements	111,071 53	112,320 18		1,248 65	
Pre-emption Sales under Act 1908	2,326,402 52	772,833 32	1,553,569 20		
Purchased Homestead Sales	254,017 48	204,372 07	49,645 41		
General Sales	112,636 24	96,764 82	15,871 42		
Map Sales, Office Fees, etc	13,976 95	11,485 83	2,491 12		
Rentals of Land	10,112 04	8,975 60	1,136 44		
Survey Fees	6,638 68	6,977 35		338 67	
Timber Dues	429,403 09	378,960 68	50,442 41		
Grazing lands	128,341 50	118,955 02	9,386 48		
Grazing lands, Improvements	1,639 80	462 52	1,177 28		
Coal lands	323,740 72	175,572 51	148,168 21		
Hay Permits	9,834 20	9,775 37	58 83		
Mining Fees	57,907 25	66,082 00		8,174 75	
Hydraulic Leases	2,338 50	2,850 63		512 13	
Dredging Leases	1,540 86	1,480 65	60 21		
Export tax on gold	99,043 07	111,457 19		12,414 12	
Free Certificates for export of gold	38 00	82 50		44 50	
Stone Quarries	7,795 48	9,053 27		1,257 79	
Irrigation Fees	629 00	542 00	87 00		
Rent of Water Power	600 00	1,862 00		1,262 00	
Irrigation Sales	14,147 75	16,872 15		2,724 40	
Fees *re* Board of Examiners D.L.S.	560 00	470 00	90 00		
Patent and Interchange Fees	250 00	495 00		245 00	
Suspense Account	3,890 34	2,258 87	1,631 47		
Interim Receipt Account Yukon	190 00	285 76		95 76	
Sand, Stone and Gravel	2,089 46	1,030 32	1,059 14		
Petroleum	92,242 37	94,535 37		2,293 00	
Forestry Branch—Sale of trees, etc	3,135 32	2,085 01	1,050 21		
Miscellaneous	381 25	998 40		616 55	
Rocky Mountains Park	40,290 93	33,224 45	7,066 48		
Jasper Park	2,828 73	1,566 61	1,262 12		
Waterton Lakes Park	1,332 00	1,393 80		61 80	
Yoho Park	385 36	442 27		56 91	
Buffalo Park	257 23	219 15	38 08		
Elk Island Park	8 25	11 50		3 25	
Glacier Park	542 25	583 50		41 25	
Moose Mountain Buffalo Park	1 50	52 00		50 50	
Antelope Park	205 20		205 20		
Revelstoke Park		25		25	
	4,189,905 55	2,443,479 92	1,844,496 71	98,071 08	1,746,425 63
Refunds	134,243 14	143,929 45		9,686 31	
	4,055,662 41	2,299,550 47	1,844,496 71	88,384 77	1,756,111 94

In addition to $112,636.24 on account of General Sales the Department received $407,125.71 from sales of railway lands, which sum, as provided for by Orders in Council, has been credited to special accounts in the books of the Finance Department.

STATEMENT showing Receipts on Account of Dominion Lands, from July 1, 1872, to March 31, 1917.

Fiscal Year.	Homesteads Fees.	Pre-emption Fees.	Improvements.	Sales.		Map Sales, Office and Registration Fees, etc.	Dominion Lands Surveyors Examination Fees.	Rents, Survey Fees, Miscellaneous, including Trust Account.	Purchased, Homestead, Inspection, Cancellation and Sundry Fees.	Timber Dues.
				Cash.	Scrip.					
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
1872-73	6,960 00			19,170 20						109 25
1873-74	7,310 00			19,834 75				125 50		2,710 55
1874-75	11,510 00			13,666 90		129 00				2,335 25
1875-76	4,680 00			3,478 94	320 00					387 00
1876-77	2,250 00			1,085 86	136,955 16	4 60		100 00	40 00	320 00
1877-78	14,540 00			2,794 86	120,159 54		180 00		290 00	1,620 00
1878-79	17,690 00			4,998 39	210,904 84	81 00	310 00	13 70	410 00	325 00
1879 80	41,255 00	10,241 45		45,708 97	81,685 86	245 40	580 00	183 25	1,780 00	25,121 46
1880-81	20,450 00	10,801 75	269 00	71,170 17	70,828 30	985 40	420 00	37 58		32,028 34
1881-82	54,155 00	39,843 90	1,758 00	1,240,328 27	50,590 84	3,036 45	890 00	58 10		58,753 14
1882-83	73,015 00	54,725 00	7,114 91	516,092 21	33,638 40	3,109 50	890 00	501 77	45	90,066 46
1883-84	41,580 00	28,810 00	2,596 11	424,863 36	40,919 67	1,289 55	530 00	45,766 53	1,713 00	147,983 10
1884-85	25,645 00	17,100 00	2,328 75	199,275 32	45,875 60	1,621 82	370 00	50,068 57	2,685 00	87,474 99
1885-86	26,110 00	14,371 00	1,101 50	76,140 41	214,657 97	1,339 34	360 00	20,070 00	5,025 40	64,820 31
1886-87	19,614 00	6,887 93	1,971 55	48,175 76	337,640 19	1,171 39	240 00	44,561 00	7,778 53	65,111 74
1887-88	23,691 00	4,830 00	1,918 35	52,238 36	313,522 67	1,660 75	240 00	20,591 41	12,078 50	94,964 55
1888-89	39,460 00	10,550 00	4,128 48	57,513 16	318,238 57	1,410 16	220 00	10,389 57	20,402 50	90,290 00
1889-90	35,920 00	8,580 00	3,250 54	54,896 85	228,744 47	2,099 07	190 00	3,316 23	20,232 50	84,642 95
1890-91	29,164 10		6,302 61	91,664 98	171,425 14	1,854 78	88 00	7,951 05	14,712 50	102,902 71
1891-92	46,994 00		6,472 31	108,901 01	97,822 41	2,147 31	135 00	29,898 49	23,104 05	106,461 35
1892-93	37,689 74		7,113 50	93,671 67	77,231 18	975 20	82 00	18,509 35	22,014 00	105,865 24
1893-94	36,462 26		3,497 76	53,254 71	27,840 96	973 11	40 00	13,457 09	11,097 90	81,290 51
1894-95	29,664 88		3,567 90	37,293 71	23,269 62	695 99		6,271 77	6,566 50	74,079 20
1895-96	18,278 00		3,163 15	46,373 98	46,929 65	610 78	50 00	21,679 31	6,810 50	61,923 47
1896-97	21,179 00		3,737 01	49,335 53	16,929 38	795 05	70 00	19,421 98	8,527 00	68,992 82
1897-98	34,780 00		5,649 63	80,178 64	28,918 14	1,987 40	10 00	21,242 66	10,042 50	119,313 78
1898-99	58,235 00		4,297 62	116,598 35	21,307 58	1,262 05	20 00	75,085 95	13,549 00	155,360 63
1899-1900	72,690 00		4,835 81	103,247 58	88,756 22	1,258 85	190 00	38,072 54	14,937 00	126,345 82
1900-1901	79,910 00		5,213 32	40,360 93	326,270 03	3,874 14	165 00	70,970 54	12,722 00	209,399 32
1901-1902	144,425 00		8,481 46	66,950 21	169,767 13	5,792 96	370 00	71,997 30	663 00	207,790 90
1902-1903	320,409 65		11,829 08	155,507 59	158,452 66	5,911 96	365 00	125,158 56	595 00	470,916 93
1903-1904	255,772 36		15,119 47	196,750 15	188,424 22	5,549 13	463 50	81,550 46	1,081 00	397,344 33
1904-1905	304,806 25		21,571 25	154,128 04	19,644 59	4,879 13	906 50	144,924 31	1,205 00	266,951 46
1905-1906	417,834 25		31,795 19	442,588 69	7,654 57	6,042 34	474 00	141,948 55	976 25	292,684 53
1906-1907 (nine months)	215,449 55		39,763 63	494,117 12	11,349 89	5,449 06	420 00	69,536 31	1,089 51	379,476 32
1907-1908	301,693 73		71,139 47	656,303 03	92,311 24	7,727 29	690 00	148,914 00	1,283 50	473,608 94

1908–1909	389,039 00	141,550 15	70,928 86	951,442 28	20,136 27	296 55	1,040 00	75,596 36	9,946 50	269 837 52
1909–1910	415,232 00	174,250 00	105,009 07	1,239,037 33	9,973 84	9,135 49	1,577 10	100,257 89	14,028 30	378, 010 76
1910–1911	445,135 00	156,485 00	143,227 13	1,193,756 04	1,437 84	8,730 01	1,310 00	42,111 92	20,142 85	387'054 96
1911–1912	391,703 12	102,070 00	184,825 92	1,967,182 85	3,256 99	11,239 14	1,400 00	44,167 03	14,745 50	400'668 61
1912–1913	337,055 00	85,940 00	168,904 12	1,650,491 87	6,157 27	14,483 91	1,040 00	17,866 65	11,380 00	463'738 75
1913–1914	317,412 00	61,660 00	187,052 46	1,279,223 51	240 00	16,056 07	1,350 00	40,148 65	8,402 00	378,365 33
1914–1915	238,295 00	28,720 00	111,982 17	691,122 56	80 00	14,290 23	970 60	32,218 77	4 776 10	310,934 29
1915–1916	170,350 00	22,760 00	112,782 70	1,073,970 21	....	11,485 83	470 00	19,495 98	3,475 00	378,960 68
1916–1917	112,110 20	14,690 00	112,711 33	2,707,203 99	332 61	13,976 95	560 00	21,212 91	2,910 00	429,403 09
Total	5,707,604 09	994,866 16	1,480,411 32	18,592,089 30	3,820,601 51	182,663 54	19,676 70	1,695,450 19	313,218 29	7,946,746 28

STATEMENT showing Receipts on Account of Dominion Lands from July 1, 1872, to March 31, 1917.

Fiscal Year.	Grazing Lands.		Hay, Coal, Mining, Stone Quarries Export Tax on Gold, etc.		Canadian National Park.	Colonization Lands.		Gross Revenue.	Refunds.	Net Revenue.
	Cash.	Scrip, etc.	Cash.	Scrip.		Cash.	Scrip.			
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
1872-73								26,239 45		26,239 45
1873-74								29,980 80		29,980 80
1874-75								27,641 15		27,641 15
1875-76								8,865 94		8,865 94
1876-77								140,755 02		140,755 02
1877-78								139,584 40		139,584 40
1878-79								234,732 93		234,732 93
1879-80								206,801 37	4,636 08	202,165 29
1880-81								206,990 54	5,038 22	201,952 32
1881-82	2,245 00		40 00			354,036 17		1,865,734 87	10,687 55	1,795,047 32
1882-83	22,844 43		913 91			248,492 61		1,051,403 60	8,746 05	1,042,657 55
1883-84	11,370 60		640 90			253,713 40		1,001,776 67	9,220 50	992,556 17
1884-85	17,089 75		815 63			1,214 22		451,564 65	12,070 85	439,493 80
1885-86	29,562 51	3,131 08	1,284 83					457,973 95	63,389 12	394,584 83
1886-87	14,242 77	39,487 67	1,570 40	80 00				588,532 80	19,543 16	568,989 64
1887-88	5,922 47	23,023 28	2,273 73	80 80	2,951 58		10,000 00	569,986 68	6,277 66	563,709 02
1888-89	2,207 69	16,802 63	3,946 55		2,528 73		16,000 00	594,088 04	5,226 23	588,861 81
1889-90	1,305 57	9,021 63	9,242 08		1,094 37			462,536 26	8,209 74	454,326 52
1890-91	3,079 55	16,193 77	8,628 44	160 00	2,397 35	5 28	4,460 50	460,990 76	7,195 27	453,795 49
1891-92	3,726 80	17,222 60	5,616 85		3,648 45			452,151 08	15,291 39	436,859 69
1892-93	6,380 80	11,542 39	6,266 13		4,983 23			392,324 43	18,314 97	374,009 46
1893-94	5,740 79	7,687 86	6,243 15		2,523 92			250,069 12	4,544 01	245,525 11
1894-95	5,353 72	8,628 00	5,229 54		2,321 87			202,983 10	4,365 99	198,617 11
1895-96	7,071 86	6,255 90	5,813 51		2,734 82			227,694 93	8,368 79	219,326 14
1896-97	4,715 01	2,500 00	8,518 18		2,132 11			206,853 57	15,010 54	191,843 03
1897-98	4,728 58	510 39	699,334 76		3,045 65			1,009,741 63	4,678 55	1,005,063 08
1898-99	5,245 88		1,130,371 60		2,994 16			1,584,328 32	32,296 39	1,552,031 93
1899-1900	8,382 86	4,083 30	1,038,195 42	20 00	2,727 60			1,503,743 00	23,062 28	1,480,680 72
1900-1901	4,726 28	14,671 99	1,101,808 33	20 00	4,047 31			1,874,159 09	18,368 85	1,855,790 24
1901-1902	7,292 46	8,409 27	737,878 43		*2,861 13			1,432,679 25	27,165 55	1,405,513 70
1902-1903	13,913 33	15,041 33	607,722 05		*5,063 69			1,890,886 83	21,519 84	1,869,366 99
1903-1904	19,790 27	15,202 15	495,579 18		*9,198 48			1,681,824 70	36,721 75	1,645,102 95
1904-1905	36,145 32	5,237 36	364,923 59		*14,059 55			1,339,382 35	25,786 90	1,313,595 45
1905-1906	51,583 89	80 00	296,769 19		18,883 83			1,709,315 28	33,418 36	1,675,896 92
1906-1907 (nine months)	43,711 91	400 00	213,852 59		*15,887 42			1,490,503 31	35,117 48	1,455,385 83
1907-1908*	43,211 78	4,048 01	266,415 31		27,232 87			2,094,579 17	115,080 04	1,979,499 13
1908-1909	53,312 79	3 257 84	252,972 17		31,321 20			2,277,678 09	102,463 78	2,175,214 31

1908-1909	53,312 79	3,257 84	252,972 17	.....	31,321 20	....	....	2,277,678 09	102,463 78	2,175,214 31
1909-1910	67,434 29	5,081 47	460,154 29	.....	43.264 36	.....	....	3,022,446 13	121,431 15	2,901.014 98
1910-1911	60,702 80	2,356 00	774,569 27	....	69,054 59	.....	.....	3,306,073 41	198,689 47	3,107,383 94
1911-1912	69,519 41	1,520 00	729,240 42	.. ..	56,497 74	....	.....	3,978,036 73	197,641 35	3,780,405 38
1912-1913	79,412 76	.....	779,695 53	1,587 32	37,448 72	... .	.....	3,655,202 20	246,105 26	3,409,996 94
1913-1914	84,926 15	320 00	889,863 15	.....	48,800 33	.....	.....	3,313,819 65	277,309 33	3,036,510 32
1914-1915	101,710 58	400 00	1,600,455 09	....	37,895 97	.....	....	3,176,851 36	317,764 75	3,859,086 61
1915-1916	118,955 02	100 00	493,280 07	... .	37,493 53	.....	.....	2,443,630 92	143,942 57	2,299,697 35
1916-1917	128,341 50	....	600,934 13	....	45,851 45	... .	.... ..	4,190,238 16	134,243 14	4,055,995 02
Total	1,145,907 18	242,275 92	13,601,059 30	1,947 32	540,946 01	857,461 08	30,460 50	57,173,384 69	2,338,932 31	54,834,451 78

* Including the scrip.

STATEMENT showing Yearly the Gross Revenue (in cash only) received from all sources from July 1, 1897, to March 31, 1917.

Fiscal Year.	Dominion Lands.	School Lands.	Seed Grain.	Ordnance Lands.	Fines and Forfeitures.	Registration Fees.	Casual Revenue.	Chinese Immigration Revenue.	Total.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
1897–1898	980,313 10	52,410 82	12,351 71	22,537 17	529 06	14,263 50	260 92		1,082,666 28
1898–1899	1,563,020 74	41,249 77	12,388 69	12,349 65	2,801 03	19,220 73	2,620 91		1,653,651 52
1899–1900	1,410,883 48	220,874 78	15,271 84	11,043 53	1,452 92	21,751 90	3,664 00		1,684,942 45
1900–1901	1,533,197 07	48,049 83	15,711 63	14,604 47	1,977 96	33,979 77	1,587 57		1,649,108 30
1901–1902	1,254,333 56	193,410 75	20,293 06	16,967 36	1,955 61	50,854 99	3,900 62		1,541,715 95
1902–1903	1,716,597 20	392,206 93	28,789 97	17,612 79	5,220 88	81,404 18	2,230 26		2,244,062 21
1903–1904	1,478,106 33	233,769 62	26,122 30	30,494 34	5,911 92	109,233 73	3,402 94		1,887,041 18
1904–1905	1,314,485 40	332,914 48	16,471 34	10,346 90	10,018 49	123,082 86	4,258 14		1,811,577 61
1905–1906	1,701,580 71	608,960 79	12,577 29	10,893 17	3,304 77	180,310 73	8,496 09		2,526,123 55
	14,431,267 10	2,848,201 50	170,827 89	153,513 28	33,193 64	680,226 59	42,207 26		18,359,437 26
1906–1907 (nine months)	1,478,749 51	724,353 73	10,850 06	6,663 90	21 00	46,124 20	11,785 81		2,278,548 21
1907–1908	1,998,219 92	708,045 83	12,899 84	8,674 95	1,650 00	2,256 65	20,069 03		2,751,816 22
1908–1909	2,254,283 98	687,422 74	53,590 86	205,749 96	281 00	1,352 13	26,224 29		3,228,904 96
1909–1910	3,007,390 82	1,292,259 95	175,152 72	189,902 48	211 00	1,471 49	42,625 96		4,709,014 42
1910–1911	3,302,279 57	1,614,733 93	153,351 14	6,009 34	4,052 22	1,378 19	11,336 06		5,093,140 45
1911–1912	3,973,259 74	1,594,533 96	119,634 13	11,566 46	10,510 48	1,066 05	32,824 65	971,339 00	6,714,734 47
1912–1913	3,647,457 61	1,621,508 11	171,342 87	60,607 80	7,150 35	1,241 25	22,873 55	3,549,242 00	9,081,423 54
1913–1914	3,313,259 65	1,215,822 37	176,736 89	5,805 98	7,888 50	966 50	27,884 47	2,644,593 00	7,392,957 36
1914–1915	3,177,386 73	943,717 00	68,263 56	4,416 64	5,828 00	969 85	11,738 10	588,124 00	4,860,443 88
1915–1916	2,443,479 92	934,965 37	2,525,528 50	5,997 98	3,675 21	908 15	28,002 62	19,389 00	5,961,346 75
1916–1917	4,189,905 55	1,699,370 06	3,652,729 05	5,553 26	2,184 72	796 85	15,618 26	140,487 00	9,706,644 75
	31,306,923 49	12,312,379 32	7,109,229 56	504,284 85	42,831 48	12,407 11	239,196 99	7,913,174 00	59,440,426 80
Increases	16,875,656 39	9,464,177 82	6,938,401 67	350,771 57	9,637 84		196,989 73	7,913,174 00	41,080,989 54
Decrease						667,819 48			

SESSIONAL PAPER No. 25

STATEMENT of Revenue collected within the Canadian National Parks for the Fiscal Year ended March 31, 1917, as compared with the previous year.

Particulars.	Fiscal Years. 1916-1917.	Fiscal Years. 1915-1916.	Increase.	Decrease.	Net Increase.
Rocky Mountains Park.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Rent	9,835 33	7,038 80	2,796 53		
Timber dues	1,002 98	2,526 40		1,523 43	
Water rates (sulphur)	1,166 66	658 80	507 86		
Cold water rates	7,640 53	6,215 35	1,425 18		
Sewer rates	2,882 58	2,357 29	525 29		
Transfer fees	118 00	166 00		48 00	
Cave and basin bathing tickets	6,614 25	5,642 15	972 10		
Livery licenses	651 00	758 00		107 00	
Pool, billiard and bowling licenses	260 00	250 00	10 00		
Boat licenses	85 00	85 00			
Butcher licenses	120 00	80 00	40 00		
Grazing rental	382 00	304 00	78 00		
Hot Springs bathing tickets	4,905 65	3,009 80	1,895 85		
Telephone rent	1,876 96	1,975 02		98 06	
Fines	236 00	600 50		364 50	
Peddlers' licenses	86 00	105 00		19 00	
Guides' licenses	65 00	110 00		45 00	
Camping permits	47 00	50 00		3 00	
Cemetery lots	34 00	127 00		93 00	
Tea room licenses	140 00	170 00		30 00	
Hay dues	3 00	4 25		1 25	
Sand	28 00	6 25	21 75		
Impounding fees	16 00	4 00	12 00		
Dog licenses	323 00	205 85	117 15		
Automobile licenses	1,078 00	333 00	745 00		
Scales	24 25	24 75		50	
Ice	306 23	330 19		23 96	
Sale of lime	15 25	15 25			
Theatre licenses	46 00	24 00	22 00		
Building permits	38 00	21 00	17 00		
Miscellaneous	94 26	26 80	67 46		
Restaurant licenses	30 00		30 00		
Coal royalty and fees	5 00		5 00		
Garden and dairy	25 00		25 00		
Gum machines	108 00		108 00		
Electricians' licenses	2 00		2 00		
	40,290 93	33,224 45	9,423 17	2,356 69	
Glacier Park.					
Rent	227 25	264 75		37 50	
Camping permits	6 00	9 00		3 00	
Gravel	290 50	290 50			
Grazing rental	18 00	18 00			
Timber dues	50	25	25		
Building permits		1 00		1 00	
	542 25	583 50	25	41 50	
Jasper Park.					
Timber dues	574 84	425 36	149 48		
Rent	1,654 14	733 00	921 14		
Building permits	51 00	18 00	33 00		
Boat licenses and ferry fees	3 50	5 00		1 50	
Hay dues	2 60	1 25	1 35		
Peddlers' licenses	6 00	6 00			
Grazing rental	67 00	104 00		37 00	
Guides' licenses	5 00	30 00		25 00	
Drivers' and livery licenses	18 00	12 00	6 00		
Camping permits	92 00	25 00	67 00		
Pool, billiard and bowling licenses	80 00	70 00	10 00		
Dog licenses	123 00	127 00		4 00	
Miscellaneous	131 40	10 00	121 40		
Restaurant licenses	10 00		10 00		
Telephone rent	10 25		10 25		
	2,828 73	1,566 62	1,329 62	67 50	

STATEMENT of Revenue collected within the Canadian National Parks for the Fiscal Year ended March 31, 1917, as compared with the previous year.—*Continued.*

Particulars.	Fiscal Years.		Increase.	Decrease.	Net Increase.
	1916–1917.	1915–1916.			
Yoho Park.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Timber dues	29 00	26 00	3 00		
Hay dues	1 50	1 40	0 10		
Rentals	252 61	355 37		102 76	
Transfer fees	4 00	8 00		4 00	
Camping permits	7 00	3 00	4 00		
Cemetery lots	12 00	3 00	9 00		
Grazing	74 00	43 00	31 00		
Ice	0 25	0 25			
Building permits	4 00	2 00	2 00		
Miscellaneous	1 00	0 25	0 75		
	385 36	442 27	49 85	106 76	
Waterton Lakes Park.					
Rent	235 61	102 50	133 11		
Camping permits	63 00	42 00	21 00		
Timber dues	11 25	18 00		6 75	
Fines	217 10		217 10		
Guides' licenses	5 00	5 00			
Grazing rental	715 54	1,221 30		505 76	
Hay dues	1 50	5 00		3 50	
Drivers' and livery licenses	2 00		2 00		
Boat licenses	47 00		47 00		
Transfer fees	2 00		2 00		
Building permits	2 00		2 00		
Tea room licenses	10 00		10 00		
Miscellaneous	20 00		20 00		
	1,332 00	1,393 80	454 21	516 01	
Elk Island Park.					
Timber dues	2 25	1 50	75		
Camping permits	1 00	5 00		4 00	
Boat licenses	5 00	5 00			
	8 25	11 50	75	4 00	
Buffalo Park.					
Hay dues	7 20	25 70		18 50	
Timber dues	7 50	4 75	2 75		
Grazing rental		4 00		4 00	
Miscellaneous	242 53	184 70	57 83		
	257 23	219 15	60 58	22 50	
Revelstoke Park.					
Timber dues		25		25	

STATEMENT of Revenue collected within the Canadian National Parks for the Fiscal Year ended March 31, 1917, as compared with the previous year.—*Concluded.*

Particulars.	Fiscal Years.		Increase.	Decrease	Net Increase.
	1916–1917.	1915–1916.			
Moose Mt., Buffalo Park.	$ cts.	$ cts.	$ ces.	$ cts.	$ cts.
Hay dues	1 50	52 00		50 50	
Antelope Park.					
Grazing rental	205 20		205 20		
Total	45,851 45	37,493 53	11,523 63	3,165 71	8,357 92

COMPARATIVE Statement of the Homestead Entries and Sales made during the Fiscal Years ending March 31, 1916, and March 31, 1917, respectively.

	Fiscal Year ending March 31, 1916.		Fiscal Year ending March 31, 1917.	
	No. of Entries.	Acres.	No. of Entries.	Acres.
Homesteads	17,030	2,724,800	11,199	1,791,840
Sales	453	13,472	89	27,074

STATEMENT showing the number of Homestead Entries reported in each year since 1874.

Departmental Year ended—	Number of Entries.
October 31, 1874	1,376
" 31, 1875	499
" 31, 1876	347
" 31, 1877	845
" 31, 1878	1,788
" 31, 1879	4,068
" 31, 1880	2,074
" 31, 1881	2,753
" 31, 1882	7,483
" 31, 1883	6,063
" 31, 1884	3,753
" 31, 1885	1,858
" 31, 1886	2,657
" 31, 1887	2,036
" 31, 1888	2,655
" 31, 1889	4,416
" 31, 1890	2,955
" 31, 1891	3,523
" 31, 1892	4,840
" 31, 1893	4,067
" 31, 1894	3,209
December 31, 1895	2,394
" 31, 1896	1,857
" 31, 1897	2,384
" 31, 1898	4,848
" 31, 1899	6,689
June 30, 1900	7,426
" 30, 1901	8,167
" 30, 1902	14,673
" 30, 1903	31,383
" 30, 1904	26,073
" 30, 1905	30,819
" 30, 1906	41,869
Nine months ended March 31, 1907	21,647
Year ended March 31, 1908	30,424
" " " 31, 1909	39,081
" " " 31, 1910	41,568
" " " 31, 1911	44,479
" " " 31, 1912	39,151
" " " 31, 1913	33,699
" " " 31, 1914	31,829
" " " 31, 1915	24,088
" " " 31, 1916	17,030
" " " 31, 1917	11,199

SESSIONAL PAPER No. 25

STATEMENT showing the number of Homestead Entries made during the fiscal years ended March 31, 1916 and 1917, and the Nationality of the Homesteaders, as reported by the several agencies of the department in Manitoba, Saskatchewan, Alberta, and British Columbia.

Nationalities.	No. of Entries 1916.	No. of Entries 1917.
Canadians from Quebec	505	496
" Ontario	1,885	1,500
" Nova Scotia	137	124
" New Brunswick	82	70
" Prince Edward Island	54	51
" Manitoba	1,137	657
" Saskatchewan	280	284
" Alberta	310	233
" British Columbia	63	68
Persons who had previous entry	2,779	1,642
Newfoundlanders	14	1
Canadians returned from the United States	19	17
Americans	2,416	1,734
English	2,374	1,469
Scotch	700	496
Irish	314	194
French	111	65
Belgians	103	46
Swiss	37	30
Italians	100	48
Roumanians	40	24
Syrians	5	5
Germans	170	75
Austro-Hungarians	1,745	735
Hollanders	50	41
Danes (other than Icelanders)	100	57
Icelanders	74	36
Swedes	342	235
Norwegians	309	226
Russians (other than Finns)	719	489
Finns	.....	9
Jews	6	.....
Chinese	4	.....
Japanese	2	3
Turks	4	.....
Australians	4	10
New Zealanders	2	.....
Serbians	4	2
Bulgarians	4	2
Hindoos	4	3
South Africans	4	3
Central Americans	4	.....
Montenegrins	1	.....
Arabians	2	.....
Brazilians	1	.....
South Americans	4	.....
Spanish	.....	3
Portuguese	.....	1
Poles	.....	7
Armenians	.....	1
Jamaicans	.....	3
Greeks	3	1
Mexicans	3	.....
	17,030	11,199

Number of souls represented by above entries, 38,553—1916.
" " " " 25,791—1917.

STATEMENT showing the number of Letters Patent issued by the Department of the Interior for Dominion Lands since 1873, and the number of acres patented.

Period.	Number of Patents Issued.	Acreage.
1873, May to December 31	420	67,200
1874, January 1 to December 31	577	92,320
1875, January 1 to October 31	464	74,240
1876, year ended October 31	318	50,880
1877 " "	2,437	478,840
1878 " "	2,357	462,880
1879 " "	2,663	426,080
1880 " "	1,084	173,440
1881 " "	1,885	400,862
1882 " "	2,197	506,785
1883 " "	4,341	831,341
1884 " "	3,896	909,604
1885 " "	3,533	898,464
1886 " "	4,570	942,055
1887 " "	4,599	1,071,364
1888 " "	3,275	647,644
1889 " "	3,282	661,636
1890 " "	3,273	626,019
1891 " "	2,449	411,073
1892 " "	2,955	549,257
1893 " "	2,936	502,601
1894 " "	2,553	420,238
1894, November and December	413	66,102
1895, year ended December 31	2,118	348,964
1896 " "	2,665	531,861
1897 " "	2,972	499,859
1898 " "	3,037	646,671
1899 " "	3,904	714,748
January 1, 1900, to June 30	1,970	310,501
1901, year ended June 30	6,461	6,846,857
1902 " "	8,768	4,711,104
1903 " "	7,349	3,266,388
1904 " "	6,890	2,982,579
1905 " "	8,798	6,197,354
1906 " "	12,370	4,181,345
July 1, 1906, to March 31, 1907	10,596	2,361,330
1908, year ended March 31	18,690	6,138,977
1909 " "	22,431	4,215,326
1910 " "	22,854	3,662,259
1911 " "	21,754	3,710,288
1912 " "	19,354	3,155,388
1913 " "	24,965	4,209,388
1914 " "	31,053	5,192,141
1915 " "	24,260	3,996,013
1916 " "	18,989	3,089,636
1917 " "	18,774	3,019,178
	357,499	85,259,080

SESSIONAL PAPER No. 25

STATEMENT showing number of Homestead Entries granted in the provinces of Manitoba, Saskatchewan, Alberta and British Columbia for Fiscal Year 1916-17, as compared with Fiscal Year 1915-16.

Agency.	1916–17.	1915–16.	Increase.	Decrease.
MANITOBA.				
Brandon		86		86
Dauphin	1,005	1,636		631
Winnipeg	1,271	2,238		967
Total	2,276	3,960		1,684
SASKATCHEWAN.				
Battleford	518	739		221
Estevan	1	23		22
Humboldt	334	546		212
Maple Creek	552	750		198
Moose Jaw	546	708		162
Prince Albert	736	1,225		489
Meadow Lake	7		7	
Regina	6	85		79
Saskatoon	332	439		107
Swift Current	493	762		269
Weyburn	200	309		109
Yorkton	380	661		281
Total	4,105	6,247	7	2,149
ALBERTA.				
Calgary	511	685		174
Edmonton	1,858	3,202		1,344
Fort McMurray		39		39
Grand Prairie	836	863		27
High Prairie	71	27	44	
Lethbridge	158	201		43
Medicine Hat	443	398	45	
Peace River	423	566		143
Red Deer	250	429		179
Total	4,550	6,410	89	1,949
BRITISH COLUMBIA.				
Kamloops	170	236		66
New Westminster	47	123		76
Revelstoke	51	54		3
Total	268	413		145

Grand total fiscal year 1915–16	17,030
" " 1916–17	11,199
Net decrease for fiscal year 1916–17	5,831

STATEMENT of Land Sales by Railway Companies having

Year.	Hudson's Bay Company.		Canadian Pacific Railway Company.		Manitoba South-western Colonization Railway Company.		Qu'Appelle, Long Lake and Saskatchewan Railroad and Steamboat Company.	
	Acres.	Amount.	Acres.	Amount.	Acres.	Amount.	Acres.	Amount.
		$		$		$		$
1893			93,184	295,288	14,164	57 559	1,603	
1894	7,526	48,225	43,155	131,628	6,312	28,003	640	
1895	4,431	23,209	55,453	176,950	5,623	22,330	2,391	
1896	9,299	52,410	66,624	220,360	21,254	88,568	286	
1897	10,784	53,277	135,681	431,095	63,800	634,644	2,524	
1898	62,000	310,000	242,135	757,792	106,473	363,982	22,534	
1899	56,875	274,625	261,832	814,857	58,019	199,558	61,030	178,517
1900	70,196	352,631	379,091	1,152,836	133,507	437,449	18,932	53,974
1901	82,308	399,804	339,985	1,046,665	59,749	214,913	22,266	74,810
1902	269,577	1,412,332	1,362,478	4,440,500	206,411	713,365	39,835	147,365
1903	330,046	1,939,804	2,260,722	8,472,250	250.372	699,210	843,900	1,476,900
1904	144,857	879,910	857,474	3,516,864	29,522	113,303		
1905	139,721	865,905	411,451	2,045,800	80,342	296,936		
1906	236,191	1,863,375	1,012,322	6,015,060	83,418	360,889		
1907 (9 months to Mar. 31	69,158	742,221	851,083	4,817,632	3,051	22,645	1,353	16,789
1908	21,184	267,215	81.060	727,367	31,982	153,007	5,621	68,869
1909	25,449	288,836	29,331	383,390	10,396	84,845	37,662	380,371
1910	104,382	1,297,454	655,585	10,473,425	14,501	126,950	106,000	964,600
1911	267,038	3,747,768	715,095	10,372,661	20,313	284,859	113,533	1,237,204
1912	42,554	808,943	855,280	12,420,488	18,932	117,497	35,213	495,116
1913	53,581	1,128,806	447,158	6,348,352	2,768	48,639	15,395	255,399
1914	26,292	572,837	263,962	4,242,089	7,626	91,948	1,629	21,546
1915	16,400	306,550	151,262	2,496,872	489	5,508	1,292	19,116
1916	79,310	1,273,144	242,215	3,670.421	4,780	58,808	12,246	180,361
1917	254,941	4.234,244	405,764	6,612,040	12,470	165,245	21,533	331,596
Totals	2,384,100	23,143,525	12,219,382	92,082,662	1,246,274	5,990,600	1,367,418	5,902,535

Government Land Grants, and by the Hudson's Bay Company.

Calgary and Edmonton Railway Company.		Canadian Northern Railway Company.		Great Northwest Central Railway Company.		Totals.		Average per cent.
Acres.	Amount.	Acres.	Amount.	Acres.	Amount.	Acres.	Amount.	
	$		$		$		$	$ cts.
11,260	.....	.....	.....	.....	.....	120,211	352,847	2 93
11,035	.....	.....	.....	.....	.....	68,668	207,856	3 02
46,815	.....	.....	.....	.....	.....	114,713	222,489	1 94
10,553	.....	.....	.....	.....	.....	108,016	361,338	3 34
9,436	.....	.....	.....	.....	.....	222,225	719,016	3 23
15,481	.....	.....	.....	.....	.....	448,623	1,431,774	3 18
24,738	53,335	.....	.....	.....	.....	462,494	1,520,792	3 28
46,653	128,256	.....	.....	.....	.....	648,379	2,125,146	3 27
116,719	352,037	.....	.....	.....	.....	621,027	2,088,269	3 36
323,494	1,033,396	.....	.....	.....	.....	2,201,795	7,746,958	3 56
231,800	909,600	183,736	631,503	128,435	522,490	4,229,011	14,651,757	3 46
129,007	563,507	64,469	313,575	41,858	177,081	1,267,187	5,564,240	4 39
109,191	512,898	231,707	1,221,469	17,593	103,564	990,005	5,046,572	5 09
85,784	480,063	204,966	1,014,351	20,003	137,503	1,642,684	9,871,241	6 01
59,515	346,064	289,576	1,711,109	4,023	41,470	1,277,759	7,697,930	6 02
8,606	75,644	196,946	1,746,504	1,294	13,855	346,693	3,052,461	8 80
6,370	66,508	.....	.....	165	7,935	109,373	1,211,885	11 08
18,323	182,926	285,428	2,783,010	571	6,863	1,184,790	15,835,228	13 36
11,820	116,231	277,414	3,336,797	1,438	27,417	1,406.651	19,122,937	13 59
10,853	154,424	365,926	4,216,578	632	11,373	1,329,390	18,224,419	13 70
4,155	44,212	182,491	2,009,642	1,601	32,105	707,149	9,867,155	13 95
19,575	460,129	182,491	2,009,642	.....	.....	501,575	7,398,191	14 75
23,042	444,018	.....	.....	316	6,965	172,801	3,279,031	17 01
11,689	172,033	.....	.....	4,646	81,182	354,886	5,435,949	15 32
33,821	573,875	17,796	298,938	8,829	141,439	737,358	12,058,439	16 35
1,378,735	6,679.156	2,482,946	20,492,118	231,404	1,311,242	21,293,463	155,093,920	7 28

THE LAND SITUATION, Manitoba, Saskatchewan, and Alberta, corrected January 1, 1917.

Province.	Surveyed Area.			Unsurveyed Area.		
	Land.	Water.	Total.	Land.	Water.	Total.
Manitoba	31,330,899	4,088,237	35,419,136	112,239,799	13,513,363	125,753,162
Saskatchewan	76,895,339	1,879,656	78,774,995	75,444,981	6,868,024	82,313,005
Alberta	83,752,860	2,268,865	86,021,725	75,125,800	2,234,875	77,360,675
Totals	191,979,098	8,236,758	200,215,856	262,810,580	22,616,262	285,426,842

Province.	Total Area.		
	Land.	Water.	Total.
Manitoba	143,570,698	17,601,600	161,172,298
Saskatchewan	152,340,320	8,747,680	161,088,000
Alberta	158,878,660	4,503,740	163,382,400
Totals	454,789,678	30,853,020	485,642,698

A large proportion of the unsurveyed area has not yet been explored except in a very partial way, and the area suitable for agriculture cannot be estimated with any degree of accuracy.

DETAILED STATEMENT of Surveyed Areas in Manitoba, Saskatchewan, and Alberta, January 1, 1917.

—	Manitoba.	Saskatchewan.	Alberta.	Total.
	Acres.	Acres.	Acres.	Acres.
Area under Homestead (including Military Homesteads)	8,371,000	27,031,000	17,956,000	53,358,000
Area under Pre-emption and Purchased Homesteads	. . .	5,908,800	2,887,000	8,795,800
Area under Northwest Half-Breeds Scrip, Sales and Special Grants	4,235,000	2,270,000	1,208,000	7,713,000
Area granted to Railway Companies	3,566,997	15,177,063	13,120,014	31,864,074
Area granted to Hudson's Bay Company	1,196,742	3,088,188	2,104,141	6,389,071
Area of School Land Endowment	1,564,600	3,957,700	3,424,000	8,946,300
Area sold under Irrigation System	. . .	76,921	980,680	1,057,601
Area of Manitoba Swamp Lands disposed of by the Province	848,154	. . .	. . .	848,154
*Area under Timber Licenses	1,176,900	1,393,300	1,361,300	3,931,500
*Area under Grazing Leases	66,300	2,548,300	2,784,200	5,398,800
*Area of Forest Reserves and Parks	2,606,400	6,195,700	16,813,400	25,615,500
*Area of Road Allowances	964,943	1,460,647	1,263,438	3,689,028
Area of Parish and River Lots	503,419	82,452	118,485	704,356
Area of Indian Reserves	432,884	1,187,130	1,368,156	2,988,170
Area of Indian Reserves Surrendered	87,560	326,738	302,046	716,344
*Area of Water-Covered Lands (Surveyed Area)	4,088,237	1,879,656	2,268,865	8,236,758
*Area Reserved for Forestry Purposes (Inside Surveyed Tract)	746,300	1,430,000	1,666,000	3,842,300
Area now available for Entry	4,963,700	4,761,400	16,396,000	26,121,100
Total Surveyed Area	35,419,136	78,774,995	86,021,725	200,215,856

* Area not available for Cultivation.

THE UNEXPLOITED NORTH.

With the advent of the railway, the northern portions of the provinces of Manitoba, Saskatchewan, and Alberta are coming more and more into prominence. Northern Manitoba has been almost crossed by the Hudson Bay railway, from Pas to Nelson. In northern Alberta the steel now connects Edmonton with Peace River, Spirit River, and Grande Prairie in the Northwest, with Athabaska 100 miles due north, and with McMurray 290 miles to the northeast. The extension of the line from Spirit River to Pouce Coupé is well under way. All told, nearly 700 miles of railway have been completed in Alberta, north of Edmonton. Northern Saskatchewan is not quite so well served in the matter of railways, but several branches of the transcontinental roads are running into Prince Albert from the south, with a spur to the northwest, of some fifty miles. All these roads have been pushed ahead during the past three years, notwithstanding the tremendously adverse conditions created by the world war. In addition, the great waterways of the Peace, Saskatchewan, and Athabaska rivers, and the lakes Winnipeg and Lesser Slave, are now being traversed by modern freight and passenger steamers of considerable capacity.

British capital, largely furnished by the well-known Lord Rhondda—the present Food Controller of Great Britain—is being utilized to develop the Peace River district, with an already marked effect. The three great industries of agriculture, lumbering, and mining will soon be definitely tested, as to their ultimate possibilities, in these northern areas. Of the three, it is probable that the matter of the country's ultimate prosperity will have to depend chiefly on the uncovered mineral deposits, the indications of which are becoming more and more encouraging from day to day.

Northern Manitoba has been attracting considerable attention within the past two seasons. In the summer of 1916, Messrs. Wallace and Delury, of the University of Manitoba—acting for the Provincial Government—made an exploratory tour of this new part of the province, and published a report which was replete with valuable information, not only as regards the mineral wealth of the district, but also the possibilities with respect to timber, water-powers, agricultural, and other natural resources.

As recently as last July, a great amount of actual work was in progress in the mineral belt on both sides of the Hudson Bay railway. Much of it was of a prospecting nature, but in several cases sulphide ore was being exported. The agricultural possibilities, too, along the line of the Hudson Bay railway appear very promising.

In northern Saskatchewan the work of investigation and report has not been so fully overtaken; although both the Forestry and Dominion Water Power Branches have gathered considerable data of a valuable nature. While the southern portions of this province have naturally been settled earliest, the central districts are rapidly filling up. There are, however, many acres of rich, fertile land open for the homesteader, both north and south of the Saskatchewan river: As has been said, several lines of railway are now running in to Prince Albert from the south, with one branch to the north. The advent of these roads will settle the great question of transportation. North of Prince Albert lies an immense forest district, stretching to the confines of the province. While the timber is comparatively small, many millions of feet of it will undoubtedly be converted into pulp, railway ties, etc., as the march of settlement advances.

When the population of this portion of Saskatchewan is sufficient to warrant the expenditure, the great river and its tributaries will furnish enormous water-power for industries of every description. Saskatchewan, besides being the largest wheat producer in Canada of the different provinces, has also the greatest timber output of the three prairie provinces, averaging, for spruce alone over two and one-half million dollars annually.

As to the province of Alberta, the Peace River district is now attracting the most attention, having come to the fore through the rapid railway development which has been carried north and west of Edmonton. With the cessation of hostilities in Europe, there will undoubtedly be a great influx of settlers from Britain and allied countries into this new-old corner of Alberta. Eighty per cent of the wood of this province is spruce, which augurs well for the development of a large pulp industry, carrying with it the ultimate establishment of many paper mills. As regards coal areas, it is not usually known that Alberta is the richest province in Canada, the deposits covering over 20,000 square miles in extent.

Description of the Work of the Topographical Surveys Branch.

The number of survey parties engaged on the survey of Dominion Lands was reduced from sixty-five in 1915 to fifty in 1916. This was done in order to reduce expenditure during the war.

All the fifty parties were employed on daily pay, as no more work is being executed under contract. They were distributed as follows: Six parties in Manitoba, twelve in Saskatchewan, seventeen in Alberta, five in British Columbia, one in the Yukon Territory, and nine partly in one province and partly in another.

Only three parties were employed on base lines. They ran 568 miles in northern Alberta and northern Saskatchewan. One party was engaged in retracing old base lines, where errors were known to exist, 513 miles being surveyed in this way.

Fifteen parties were engagd on regular subdivision in Manitoba, Saskatchewan, and Alberta, and five parties worked in the railway belt of British Columbia.

Owing to the abrogation of the contract system, two surveyors were sufficient for inspection. These were not in charge of regular parties, but hired assistance locally when required.

The delimitation of the interprovincial boundary between Alberta and British Columbia was continued under the same arrangements as for the preceding year. The line is now marked in the passes from the international boundary to the main line of the Canadian Pacific railway.

Eleven surveyors were employed in revising the survey of lakes and rivers in townships subdivided many years ago in Saskatchewan and Alberta. Over 650 townships were investigated, and over 3,000 lakes were traversed.

Levelling on subdivision and block outlines was carried on as formerly, and several lines of precise levels were also run to connect up lines already levelled.

Three survey parties were engaged on miscellaneous subdivision, three on retracement and resurvey, and four surveyors were employed on scattered miscellaneous surveys, where the amount of work to be done did not at any one place warrant the expense of a survey party.

Following is the usual table showing the subdivision or settlement survey work completed each year since the inception of the surveys, with the result of last season's operations added:—

Period.	Acres.	Number of farms of 160 acres each.
Previous to June, 1873	4,792,292	29,952
1874	4,237,864	26,487
1875	665,000	4,156
1876	420,507	2,628
1877	231,691	1,448
1878	306,936	1,918
1879	1,130,482	7,066
1880	4,472,000	27,950
1881	8,147,000	50,919
1882	10,186,000	63,662
1883	27,234,000	170,212
1884	6,435,000	40,218
1885	391,680	2,448
1886	1,379,010	8,620
1887	643,710	4,023
1888	1,131,840	7,074
1889	516,968	3,231
1890	817,075	5,106
1891	76,560	476
1892	1,395,200	8,720
1893	2,928,640	18,304
1894	300,240	1,876
1895	406,240	2,539
1896	506,560	3,166
1897	428,640	2,679
1898	859,840	5,374
1899	1,022,720	6,392
1900 (first 6 months)	735,480	4,596
1900–1901	1,603,680	10,023
1901–1902	2,553,120	15,957
1902–1903	6,173,440	38,584
1903–1904	12,709,600	79,435
1904–1905	10,671,520	66,697
1905–1906	4,973,920	31,087
1906–1907 (9 months)	3,819,700	23,873
1907–1908	6,123,040	38,269
1908–1909	7,412,870	46,330
1909–1910	7,423,200	46,395
1910–1911	5,683,200	35,520
1911–1912	5,146,080	32,163
1912–1913	5,155,520	32,222
1913–1914	5,193,280	32,458
1914–1915	4,484,960	28,031
1915–1916	3,112,640	19,454
1916–1917	2,221,280	13,883
	176,260,225	1,101,621

THE DOMINION ASTRONOMICAL OBSERVATORY AND THE BOUNDARY AND GEODETIC SURVEYS.

The 72-inch reflecting telescope at the Dominion Astrophysical Observatory at Victoria will shortly be ready for actual observing, and provisional arrangements are being made for initiating the preliminary experimental and adjusting work as soon as the final figuring of the mirror is completed, probably early in June.

The 66-foot dome was erected and placed in satisfactory operating condition by October 1, 1916.

The mounting of the telescope, which had been temporarily erected at the works of the Warner & Swasey Company, was shipped from Cleveland about the end of

July last, arriving in Victoria the middle of August. Erection was commenced on September 5, and the heavy parts were all in place in ten days, although it was not until the middle of October that the elaborate permanent wiring was installed, and smaller details completed. The axis of the telescope was then placed in adjustment, and it is now ready for the insertion of the mirror and actual observing operations. The tests of the operating mechanism of the mounting and dome resulted most satisfactorily.

The 15-inch refractor at Ottawa has been employed during the past year in determining the radial velocities of spectroscopic binaries for the purpose of obtaining the elements of their orbits, a continuation of the work of previous years. During the year, 543 spectrograms were obtained on 162 nights, a further decrease from the number recorded last year, and for the same reasons. The orbits of six binaries have been obtained during the year, and these, with those already published and those ready for publication, make a total of fifty-one orbits obtained at Ottawa.

The 6-inch doublet of the photographic telescope has been used for extra-focal photometric observations of spectroscopic binaries whose orbits have been determined here, for variation in magnitude, but as yet without definite result. Observations by the same method for the purpose of improving the light curve of δ Librae are being made, and the methods of testing and developing the plates have been improved.

Observations with the coelostat telescope on the solar rotation and allied problems have been continued during the year, and four investigations bearing on this work have been made; the first on a variation in the solar rotation, referred to last year, showed good evidence of a cyclic change in the rate of about 8 per cent, while the last, on the effects of haze on the solar rotation, indicated the possibility that some of the changes in the rate found here and elsewhere are due to the presence of a varying amount of haze in the terrestrial atmosphere.

Since my last report the instrument for the study of the deformation of the earth under the influence of the moon and sun has been in continuous operation in the vault specially constructed therefor.

The various seismographic instruments have been in constant operation during the year, and 104 earthquakes have been recorded. The first complete seismological tables issued are now in general use for facilitating the reading of seismograms at other stations.

In the systematic magnetic survey of Canada, fifty-six stations were occupied, in which the complete magnetic elements were obtained and much new ground in northern Ontario was covered.

Owing to the war, the gravity survey was discontinued.

Observations with the meridian circle were obtained on 103 nights in 1916: they were devoted in part to determinations of clock error for longitude work and for the purposes of the Time Service, and in part to a continuation of work on the list of latitude stars mentioned in previous reports. Two observers took part during the whole year, and two others for shorter periods. Since May, 1916, the registration of transits has been effected by a printing chronograph originally designed by the late Professor Hough, of Dearborn Observatory, but considerably modified in our Observatory workshop. This instrument, which in original form was not very

satisfactory, has, with the modifications mentioned, become quite efficient, and through its use a considerable saving of labour has been effected in the reading of the records.

Four new Laplace stations have been established, two in British Columbia, one in northwestern Ontario, and one in New Brunswick. The longitudes of three of these were determined by the ordinary telegraphic method, while that of the fourth was obtained by wireless telegraphy. At three of these stations the azimuth of one of the lines of the geodetic triangulation was measured with an alt-azimuth, while at the fourth a meridian mark was established and its azimuth determined by observations with the astronomical transit used for the longitude.

A new list of 519 stars has been prepared for use in field longitude operations: it includes principally stars whose positions in the sky are such as to render them useful for longitude work in Canadian latitudes during the summer months, and is somewhat more extended than the lists of the national ephemerides. The stars were selected from Lewis Boss's "Preliminary General Calalogue for 1900," and their right ascensions and proper motions revised by the inclusion of available data from recent observations at Ottawa and Greenwich.

The time service has been maintained as in previous years. During the year the system of clocks in the Government Printing Bureau has been placed under the control from the Observatory in a similar manner to those in other Government buildings. The total number of clocks and dials at present under control is as follows:—

Minute dials	332
Seconds dials	13
Recording clocks	18
Tower clocks	2
Programme clocks	1
Secondary master clocks	9
Primary clocks	4
	379

In addition to the clock system, relays, beating seconds, are maintained in two offices in the city; time signals are sent out regularly by telegraph, and occasionally by telephone; the time is recorded on the various seismographs at the Observatory, and is given verbally over the 'phone to several hundred persons a week. A number of circuits are also maintained purely for observatory purposes, such as operation of chronographs, etc.

The final draft of the report on the survey of the 141st meridian—the boundary between Yukon Territory and Alaska—has been approved by the commissioners, and is ready for the printers. The last six of the thirty-eight map sheets have been printed; also the special Arctic sheet, index sheet, and profile of the line. Another special sheet of the St. Elias-Natazhat region is in course of preparation.

The field work of that section of the international boundary line from lake of the Woods to lake Superior is completed, with the exception of the inspection of the work, which will probably be made this coming season. This will complete the field work along the international boundary from the Arctic ocean to lake Superior.

The Quebec-Maine boundary along the Highlands was extended from monument No. 334, where the line passes between Portage lake in Quebec and Penobscot lake in Maine, to monument No. 347, which was connected with the Geodetic Survey station Linière.

Range marks on the Maine-New Brunswick water boundary were checked and verified.

A triangulation along the New Brunswick-Maine boundary from St. Leonard to the headwaters of the St. Croix was completed and a connection made with the primary triangulation of the United States Coast and Geodetic Survey.

On the Geodetic Survey of Canada the primary triangulation in New Brunswick and Nova Scotia was continued, and reconnaissance made to determine a suitable site for a base line.

In Ontario a geodetic survey party completed the observing of directions in the southwestern peninsula. A tower-building party operated in the district south of the Georgian bay, and a subsidiary triangulation was made connecting points in the city of Toronto with Scarborough station of the primary triangulation.

On the British Columbian coast a reconnaissance for the selection of triangulation stations was completed between Alert bay and Campbell river. One observing party measuring horizontal angles of the triangulation was employed in the vicinity of Prince Rupert.

Precise levelling was carried on during the season of 1916 by five parties, one of which operated in Quebec, two in Ontario, one in British Columbia, and one partly in British Columbia, and partly in Alberta. Some 1,400 miles of levelling was accomplished, including the completion of the first transcontinental line—from Halifax to Vancouver.

The total amount of precise levelling of the Geodetic Survey of Canada is now over 9,700 miles, and about 2,800 standard bench-marks have been established.

A large number of the publications giving results of precise levelling has been placed in the hands of engineers throughout the country.

Forestry.

Owing to the war the operations of the Forestry Branch have been kept to as small proportions as possible, considering the large extent of territory to be supervised and the value of the public forest property to be protected. Sixty-five men of the branch have enlisted for the war, and of these six have been killed. Of forest school undergraduates who had worked for this branch in vacation time, four have also been killed in action.

The season of 1916 was generally wet, and the fire loss was kept down to small proportions.

The great loss suffered by northern Ontario through fire in 1916 showed the need of controlling the setting out of fires by settlers in clearing their lands. As a result, the province of Ontario has enacted a new forest fire law in which settlers are allowed to burn brush only upon receiving a written permit from a fire guardian. Similar legislation has been enacted by Manitoba and Saskatchewan. This should greatly assist in protecting from fire those areas in the Prairie Provinces outside the forest reserves. The regulations covering the reserves give the necessary authority, so far as reserves are concerned.

The total number of fires reported was 891, as compared with 1,455 in 1915. The total area burned over was 116,310 acres, of which 2,000 acres contained merchantable timber. This is a large reduction as compared with the preceding two years. The fire

record emphasizes that public education as to the necessity of fire prevention is the most pressing need and the most effective means to reduce fire losses. The most important causes of fire, in order of their importance, were: unknown causes, campers and travellers, settlers, railways. This improved situation in regard to railways was due to the operations of the patrol and inspection by officers of this branch, under the direction of the Dominion Board of Railway Commissioners.

The efficiency of fire protection on forest reserves continues to improve, owing to the increase in transportation, communication, and fire-fighting facilities, due also to a somewhat better service on the part of the rangers.

The improvements include houses in which the rangers live on the reserve, tool caches, lookout towers, bridges, fireguards, roads, trails, and telephone lines.

Scientific investigation to ascertain the conditions affecting forest development has been found necessary in every forested country. War conditions have prevented new appointments or expenditure, but the Council for Scientific and Industrial Research, recently created have considered the matter of such importance as to recommend its being given early consideration in programme of research to be carried out in Canada. Forest investigation will involve co-operation on the part of the provincial forest services, and what the provinces are now doing is an indication that this co-operation will be given as soon as the research work is undertaken.

The increasing complexity of forest administration necessitates the employment of specially trained men. Existing forest schools provide men for the higher grades of the service, but there are no schools training men for forest rangers. This lack is seriously felt, and will be still more seriously felt when the question of training physically fit returned soldiers for forest work comes to be dealt with.

In regard to forest surveys, the class of survey which is being pressed forward at the present time is the general reconnaissance or exploratory survey to ascertain where the timber is located, its quality, condition, etc. These surveys have covered the greater part of the Dominion timber lands, and in three or four years more, at the same rate of progress, the whole of this territory will be covered.

Reforestation was begun on several of the forest reserves in the prairie districts, and sufficient work was done to make a fair test. The results of these plantings have so far been very successful.

The grazing of live stock on the reserves, begun a few years ago, is a feature steadily increasing in importance, more than 17,000 horses and cattle having been pastured on forest reserves in 1916. This grazing is of advantage to the reserves, and is also recommended as tending to increase the food supplies of the Empire. The business gives every promise of developing to large proportions.

Owing to labour conditions and other factors introduced by the war, the demand for trees for planting on the prairie farms was less in 1916 than in the previous year. This has had, however, a result not altogether unwelcome, as it permitted the sending to each applicant of sufficient trees to make a good shelter-belt, whereas in the past few years the large demand cut down the number of trees per applicant to a point where it took him some time to secure adequate shelter. The number of trees distributed in 1917 was over 7,500,000, as compared with a little over 4,500,000 in 1916.

For several reasons, including a scarcity of coal, there was greater demand for wood from the reserves in the winter of 1916-17 than for several seasons past. Owing to increased experience, the burning of débris as cutting proceeds was more efficiently carried out than ever before, thus greatly reducing the fire hazard in the woods.

While no new lines of investigation have been opened at the Forest Products Laboratories of Canada, and while the engagement of some members of the staff on special war work in connection with munitions has reduced somewhat the working force, the general plan of investigation and testing has been followed. Investigations are under way covering some of the most important fundamental questions in regard to the constitution of wood. Among these is an investigation regarding the composition of the principal Canadian pulpwoods, which will be of great value to the pulp and paper industry. The faith of the public in the laboratories is shown in the interest and co-operation of the wood-using industries of Canada in the work being carried on. The bulletin on "Canadian Woods for Structural Timbers" issued during the year embodied one line of investigation. It was widely distributed in Canada, throughout the Empire, and among allied and neutral nations, and the interest which it has aroused shows the demand that Canada may expect after the war, and the importance of being able to give people, both at home and abroad, definite, scientific, and reliable information about our leading woods.

An investigation into the production of wood oils for ore flotation resulted most successfully and showed what scientific investigation can do to give our industries a good supply of a home product in place of a precarious and costly supply imported from abroad, and liable to be withheld entirely because of the needs of the producing country. The investigation demonstrated that oils can be produced in Canada to take the place of imported pine oil, which up to this discovery has been absolutely essential to the carrying out of the processes of extraction of ore by flotation.

IRRIGATION.

There has been little development in connection with the larger irrigation projects. Construction work has been practically completed on the three large projects which have been under way for several years, but colonization and development work have been hampered by the falling-off of immigration, the shortage of labour, and the prevailing high prices of both labour and material.

Serious financial difficulties, largely due to war conditions, have embarrassed another of the larger companies to such an extent that reorganization of the company has recently been effected, and there is now a reasonable prospect that the works may be at least partially completed and put into operation within a year or two, although here, again, the condition of the labour market and the high cost of material may seriously retard the progress of the work.

Notwithstanding the comparatively slow rate of development of irrigated farming, evidences are not lacking of a growing realization of its value to the settlers in the drier portions of the provinces of Alberta and Saskatchewan, particularly in the production of forage crops in connection with dairying or stock-raising. The recurrence of a cycle of dry years, which, while not desired may naturally be expected, will doubtless further stimulate interest in irrigation and lead to the adoption of better methods than have heretofore been generally practised.

Survey work for the extension of some of the present large projects, or for the location of new projects, has been temporarily abandoned in the interests of economy, and, for the same reason, the administrative work has been reduced wherever possible without seriously impairing its efficiency.

The work of hydrometric surveys (stream measurement) has, however, been carried on on about the same scale as in former years. It has not been found expedient to curtail this work, as its value consists primarily in the continuity of the work over a sufficiently long term of years to ensure at least approximately accurate records. This work might well be further extended, but existing conditions have not seemed to justify any more lavish expenditure.

DRAINAGE.

For several years the question of the drainage of public land in the prairie province has been under discussion with the respective Provincial Governments, and it is a source of considerable satisfaction to be able to report that a satisfactory arrangement has now been made for dealing with this vexatious problem. This arrangement was reached as the result of several conferences between officials representing the several Governments; it has been approved by the Dominion Government, and accepted and enacted into law by the province of Alberta and partially by the province of Saskatchewan, and it is hoped that the necessary action may be taken at an early date by the provinces of Saskatchewan and Manitoba to give full effect to the arrangement.

The ownership and control of the sources of water supply in these provinces is vested in the Dominion Government, as is also the ownership of the unalienated public land while the control of drainage is vested in the provinces. This divided jurisdiction has provoked controversy and has somewhat seriously interfered with the reclamation of large areas of swamp land in all of these provinces, thus retarding the development of many districts which comprise large submerged or swampy areas.

While the new arrangement may not fully and satisfactorily serve the purpose for which it is intended, there is reason to believe that it will at least point the way to a better and lasting arrangement under which immense areas of land, now waste and valueless, may be reclaimed and made productive.

Dominion Parks.

Owing to the present financial conditions, little was undertaken in the Dominion parks in the way of new development work during the year. Expenditure was restricted almost entirely to maintenance but, following the policy adopted last year, the labour of interned aliens was utilized in several of the parks for the building of roads and trails, clearing of fireguards, and removal of dead timber, and in this way a good deal was accomplished at slight expense, which could not otherwise have been undertaken.

While the number of tourists was not so large as last year, it was observed that visitors showed a tendency to make a longer stay than formerly, and in spite of a lower total traffic, hotel, transportation, and other interests reported that the season was one of the best, financially, that they had ever known.

The large increase in the number of people entering the parks by automobile indicates that a new factor must be taken into consideration insofar as tourists traffic is concerned. In both Rocky Mountain and Waterton Lakes parks the number of cars registered last season more than doubled those of any previous year. Both of these parks are now linked up by good roads with existing provincial highways, and it seems likely that increasing numbers from the three prairie provinces, as well as from the Western States will come into the parks in this way. Not only does this promise a largely increased revenue, but it brings the benefit and advantages of the parks within reach of a much larger section of the Canadian people.

An examination of the waters of the Hot Sulphur Springs at Banff, with special regard to their radioactive properties, was made during the year by Mr. R. T. Elworthy, of the Department of Mines. The results of the analysis showed that the Banff springs are more important in this respect than any others yet investigated in Canada, and that they resemble very closely the waters of the famous springs at Bath, England.

Through the courtesy of the United States authorities, a fine herd of over sixty elk was procured for Rocky Mountains park from the Yellowstone National park. The herd was brought over by special express train from Gardiner, Mont., and made the journey to Banff in record time. While a slight loss was suffered among the yearlings, the shipment arrived in a very satisfactory condition, and all the animals have since been doing well.

A farm was established in connection with Waterton Lakes park with a view to reducing the cost of management. Owing to an unfavourable season and the late date at which operations were begun, the results were not as satisfactory as could have been wished, but it is expected that a greater success will be obtained during the coming year. The completion of the Waterton bridge has made this park accessible to motorists from southern Alberta, and resulted in a large increase in the number of visitors. The fact that it adjoins the United States Glacier National park at the boundary opens up great possibilities in the way of future development.

The government herd of pure-blood bison at Buffalo park continues to do exceptionally well. The herd now numbers over 2,400 head, with an increase of 356 for the year. The farm in connection with the park is producing excellent results. In spite of the very wet season, it was able last year not only to supply all its own requirements in the way of feed for animals, but also to ship nearly twenty thousand bushels of oats to other parks and to some of the Forestry offices.

In Jasper park, one of the finest mountains has been set aside as a memorial to Nurse Edith Cavell. The mountain is one of outstanding beauty, over 11,000 feet in height, with a wonderful hanging glacier. It is situated about 14 miles from Jasper townsite in a district unusually interesting from the scenic point of view. A road is under construction to the base of the mountain, which will enable tourists to visit this neighbourhood with comfort and convenience.

An important step was taken with regard to game protection by the creation of an interdepartmental Advisory Wild Life Board. The board, which is composed of five members, will act in an advisory capacity in all questions relating to the conservation of wild life throughout the Dominion, and under its direction the Dominion

Parks Branch will have charge of the administration of those matters which come under Federal authority. Steps will be taken in the immediate future to provide additional and much-needed protection for the barren-land caribou and fur-bearing animals of the far north.

The enforcement of the provisions of the Migratory Bird Treaty, which was recently entered into between Canada and the United States, has also been placed in the hands of the Parks Branch. The purpose of this treaty is to provide additional protection in both countries for game and insectivorous birds which migrate from one to the other. It is expected that the regulations which will shortly be promulgated will have very beneficial results in lessening the ravages among migratory birds, which have resulted in such serious damage to agriculture through the depredations of predatory insects.

With a view to supplying additional protection for wild fowl, 25 acres have been reserved in Saskatchewan and Alberta as provisional bird sanctuaries, and in the near future these will be inspected by a competent authority, and those which are suited for the purpose will be set aside and administered as Dominion bird sanctuaries.

The development of our water-powers is of vital importance to the Canadian people, intimately connected with national defence and with that great national necessity, reduction in the cost of living. It is necessary to the industrial progress of a nation and to the growth of its foreign commerce. It concerns the farmer on the Alberta prairie just as much as those who dwell in the great cities of Winnipeg, Calgary, and Edmonton.

The greatest need for the development of our water-powers is the imperative necessity, and it is indeed now a national necessity, that there should be safe and sane water-power administration. This involves two things: first, intelligent scientific investigation of our water resources, a study of their best utilization from a conservation and an economic standpoint; second, and most important of all, the establishment and intelligent enforcement of suitable water-power regulations.

While the engineering aspect of the water-powers of Western Canada has been thoroughly looked after in the investigations that have been carried on and are still under way under the direction of the Dominion Water Power Branch, the legal or administrative phase of the situation has also received most careful attention. Experts have been engaged for two years in studying the water-power administration regulations of every country in the world, which has water-power problems to solve comparable to those of Western Canada. It is recognized that there is a vital and imperatively urgent necessity for satisfactory water-power administration for the western provinces, of a character which will promote and encourage, in every way, development and utilization of enormous quantities of latent energy in our streams, now wasting to the sea, a necessity in no way local but national; it is necessary for the manufacture of ammunition for national defence; necessary for the manufacture of fertilizers that the cost of living may be decreased through increased crops; necessary for the electrification of railroads, especially terminals, for cheap carrying of freight and to provide a means of rapid and comfortable transportation for the people; necessary to the irrigation of vast tracts of land, meaning the building of thousands of homes on land now unoccupied; necessary to the establishment and bringing in of entirely new industries in Western Canada, meaning the investment

of hundreds of millions of dollars in the building of new cities and towns, and the employment of thousands of men and women; necessary if we are to maintain our commercial standing among the nations of the world; necessary in order that coal and oil may be preserved for the use of future generations; and finally, of vital necessity for promoting the safety and comfort, the welfare and prosperity of every citizen of Western Canada.

To-day it is recognized that no country in the world has a better or more modern or efficient water-power administration than that evolved under the direction of Dr. Roche for Western Canada.

SCHOOL LANDS.

During the fiscal year, in addition to sales made to railway companies for right-of-way purposes, and to school districts for school sites, nineteen auction sales of school lands were held at various points in the provinces of Manitoba, Saskatchewan, and Alberta, the total area sold in Manitoba being 37,370.10 acres for $352,538.52, an average of $9.43 per acre; in Saskatchewan, 116,695.29 acres for $1,664,233.70, an average of $14.26 per acre; and in Alberta, 144,993.03 acres for $2,039,037.37, an average of $14.06 per acre.

The sum of $5,388 was realized from the sale of townsites in the province of Manitoba, and $16,463 from sales in the province of Saskatchewan.

The total area disposed of to the 31st of March, 1917, after making deduction for cancellations, etc., was as follows:—

Manitoba	692,250·06	acres for	$ 6,700,321 54
Saskatchewan	731,829·78	" "	10,618,224 25
Alberta	701,894·94	" "	8,538,826 25
Total	2,125,974·78	" "	$25,857,372 04

Total 2,125,974.78 acres for $25,857,372.04.

The revenue derived from sources other than sales for the three provinces was as follows:—

Grazing	$ 75,181 32
Coal	7,916 26
Petroleum and gas	6,705 29
Hay	9,711 09
Timber	3,383 12
Cultivation	425 15
Total	$103,322 23

The total net revenue from each province for the fiscal year was as follows:—

Manitoba	$ 283,243 01
Saskatchewan	759,464 33
Alberta	646,896 06
Total	$1,689,603 40

The following amounts were paid over to each province under the provisions of orders in council in that behalf, being the net revenue received from school lands in these provinces, less principal moneys of sales, and less expenditures, namely:—

Manitoba	$ 60,047 50
Saskatchewan	201,624 55
Alberta	162,214 53

In addition to the foregoing, the following amounts were also paid to the Provincial Governments of Manitoba, Saskatchewan, and Alberta as interest on the School Lands' fund for the fiscal year, namely:—

Manitoba	$119,198 61
Saskatchewan	100,846 82
Alberta	86,550 43

The total amount paid to each province for the fiscal year was as follows:—

Manitoba	$179,246 11
Saskatchewan	302,471 37
Alberta	248,764 96
Total	$730,482 44

The amount standing to the credit of each of the School Lands' funds on the 1st of April, 1917, was as follows:—

Manitoba	$4,068,350 37
Saskatchewan	3,891,343 21
Alberta	3,099,222 01

The total expenditure for the fiscal year on all accounts was as follows:—

Manitoba	$13,053 69
Saskatchewan	15,962 26
Alberta	16,239 05
Total	$45,255 00

W. W. CORY,
Deputy Minister of the Interior.

PART I.

DOMINION LANDS

DOMINION LANDS

REPORT OF THE COMMISSIONER.

This is a report for the twelve months ending March 31, 1917, on the Dominion Lands Branch of this department, together with the report of the chief inspector of Dominion Lands Agencies, the reports of the inspectors of Dominion Lands Agencies, and the agents of Dominion Lands for the several districts.

The following summary has been prepared of the work transacted in the Dominion Lands Branch during the period mentioned, as compared with the corresponding twelve months of the previous year:—

	1916.	1917.
Number of files dealt with	164,928	180,833
Letters written	108,612	108,350
Triplicate copies	76,670	75,014
Circulars, reports, etc	63,859	58,729
Total	249,141	242,093
Applications for patent—		
Number examined	31,308	40,572
New applications	17,778	20,281
Applications accepted and notifications sent out	16,598	18,163

J. W. GREENWAY,
Commissioner of Dominion Lands.

REPORT OF THE CHIEF INSPECTOR OF DOMINION LANDS AGENCIES.

During the year I held many investigations of a complicated nature in connection with Dominion Lands, seven of which were under oath, authorized by Order in Council, and thirty-five of a less serious nature. I have on hand at the present time three investigations to dispose of, one of which is under oath, and two where sworn statements will have to be taken.

I visited practically all the land offices in Manitoba, Saskatchewan and Alberta during the year, and found everything very satisfactory, although some of the offices were over-rushed with work in connection with seed grain and relief, and most of the staffs were working overtime in order to cope with the increased work. Owing to the heavy amount of work in the land agencies, through collections, I was compelled to allow several of them to engage temporary help.

Mr. F. Szablewski, Chief Homestead Inspector, who is attached to my office in Minnedosa, assisted, and held many investigations among the foreign element. He has now enlisted and no one has been appointed to fill the vacancy.

Mr. O. Neff, Inspector of Dominion Land Agencies for Manitoba and Saskatchewan, and Mr. J. W. Martin, Inspector for Alberta and British Columbia, will furnish the department with a detailed account of the work done throughout the provinces under their jurisdiction, in connection with the land agencies, sub-agencies, and homestead inspectors.

During the early part of August I was instructed by the department to open up a central office for the collection of seed grain and relief indebtedness at Moosejaw. I proceeded there August 14 and opened up the office. My staff was augmented by employees of the department from the different land offices throughout the West, and I had to engage a few other parties to assist in the work.

I divided the provinces up into small districts, and furnished the homestead inspectors and outsiders with copies of lists, with instructions to collect as much as possible of seed grain indebtedness. This proved very successful. I returned to my office in Minnedosa March 20, and I am still looking after the seed grain work. For the summer months I made out new lists of indebtedness and furnished each homestead inspector with one covering his homestead inspection district. Under the new instructions they are supposed to collect as much seed grain indebtedness as possible, while on their usual inspection work, without extra cost to the department.

I received several complicated investigations from head office while at Moosejaw and disposed of one hundred and ninety-eight. I have on hand at the present time fifty-seven investigations in connection with seed grain and relief indebtedness. The opening of the central office in the West to look after the collections of seed grain indebtedness has proved very beneficial to the financial interests, and also to the department at Ottawa, as I am satisfied that we would not have collected nearly the amount of money that we have, had it not been for the organization.

H. G. CUTTLE,
Chief Inspector of Dominion Lands Agencies.

REPORT OF INSPECTOR OF DOMINION LAND AGENCIES, CALGARY, ALBERTA.

I beg to submit my annual report for the departmental year ending March 31 last.

This contains a comparative statement of the business transactions and revenue as between the years 1915-16 and 1916-17, from which will be observed a vast increase in the receipts of the different agencies. A large proportion of this money was collected in connection with seed grain and relief, which entailed a tremendous amount of office work.

J. W. MARTIN,
Inspector.

STATEMENT showing Principal Work Performed by Homestead Inspectors in Alberta and British Columbia for Departmental Year ending March 31, 1917.

Name of Homestead Inspector.	Headquarters.	Period.	Land Inspections Made.	Applications for Patent Taken.	Miles Travelled.		Expenditure.		Remarks.
					Wagon.	Rail.	Salary.	Travelling Expenses for Self and Team.	
							$ cts.	$ cts.	
Benzie, J. M.	Kamloops		457	30	3,251	2,646	1,200 00	1,217 55	
Blackwell. A. J.	Edmonton		184	33	4,887	3,674	1,300 00	983 40	
Creighton, H. E.	Red Deer		210	140	4,424	4,220	1,200 00	1,406 65	
Cunningham, T. J.	Edmonton		193	20	3,085	2,995	1,500 00	937 35	
Cook, H.	Revelstoke		172	2	728	5,468	1,200 00	520 60	
Doze, I. S.	Edmonton		475	2	4 770	1,650	1,300 00	1,011 50	
Fletcher, Jos.	Grand Prairie		165		4,132		1,200 00	823 20	
Fleming, G. W.	Calgary		151	20	3,996	1,645	1,200 00	901 00	
Grey, A.	Edmonton	10 months	259	17	3,786	1,480	1,183 32	1,057 30	Resigned.
Grasse, P. L.	Red Deer	10 "	198	6	3,679	1,478	1,300 00	1,028 04	
Hagen, S. C.	Edmonton	10 "	346	33	4,179	1,431	1,200 00	839 30	
Huntley, J. R.	Medicine Hat.	10 "	162	3	4,945	237	1.200 00	826 71	
Kembry, R. A.	Calgary.	10 "	208	25	4,944	4,099	1,200 00	1,065 55	
Key, A. E.	High Prairie	10 "	43	6	1,381	834	1,200 00	382 55	
Letson, W. A.	Edmonton	10 "	127	2	2,690	2.569	1,200 00	905 95	
Magee, W, D	New Westminster.	10 "	162		1,139	3,075		385 90	Agent.
McMullen, J. E.	Peace River	10 "	132	55	2,658	2,079	1,300 00	1,276 10	
McCowan, H. S.	Edmonton	10 "	300	20	3,215	2,188	1,200 00	795 85	
Ouillette, H. S.	Medicine Hat.	7 months	99	15	2,683	919	758 31	608 23	Resigned.
Ripley, Robt.	Lethbridge	7 "	277	178	3,639	1,185	1,200 00	955 10	
Scott, Hugh	Lethbridge	7 "	117	81	2,596	1,508	1,300 00	510 10	
Tempany, Wm.	Calgary	7 "	165	9	5,921	2,287	1,300 00	1,101 20	
Woodlock, P. A.	Calgary	7 "	460	23	4,695	5,194	1,300 00	1,441 90	
Wynne. A. E,	Edmonton	7 "	275	28	4,186	2,241	1,300 00	1,113 12	
Totals			5,337	748	85,609	55,102	28,241 63	22,094 15	

DOMINION Lands Agencies—Alberta and British Columbia—Principal Transactions for the Departmental Year ending March 31, 1917.

Agency.	Homestead Entries Granted.	Land Sales.			Applications for Patent Received.	Land Entries Cancelled.	Permits Issued.		Letters Received.	Letters Sent.	Revenue.	No. of Staff.	Expenditure.	
		Ordinary and School Lands.	Pre-emptions.	Purchased Homesteads.			Timber.	Hay.					Salaries.	Disbursements.
											$ cts.		$ cts.	$ cts.
Calgary	511	19	160	34	2,402	564	318	638	69,630	73,135	676,391 91	27	21,199 68	3,238 68
Edmonton	1,858	139	4	5	1,904	1,604	1,259	1,178	57,917	78,388	219,462 37	31	24,771 12	2,776 25
Grande Prairie	836	30			409	272	440	245	9,645	8,515	18,006 41	4	4,329 39	1,370 00
High Prairie	70				31	41	44	35	2,357	3,907	1,852 80	5	3,419 88	1,297 74
Kamloops	170	26			114	62	405	11	12,091	11,440	29,268 85	5	6,060 00	553 09
Lethbridge	156	30	33	11	751	187	195	59	35,451	36,797	649,450 69	7	7,901 86	2,453 50
Medicine Hat	445	8	230	38	1,442	567	215	289	31,562	37,318	678,605 09	11	9,689 48	1,733 59
New Westminster	46	9			26	43			2,409	2,076	14,704 63	3	3,840 00	195 00
Peace River	423	23			205	175	446	154	5,691	6,859	23,792 98	5	5,699 88	1,217 10
Revelstoke	51	10			14	35	111		11,068	12,760	33,628 07	4	3,880 00	295 44
Red Deer	249	18	30	22	755	321	171	467	25,522	16,511	88,371 85	11	9,433 98	1,107 06
Totals	4,815	312	457	110	8,053	3,871	3,604	3,076	263,343	287,706	2,433,535 65	113	102,325 27	16,237 45
Totals 1915-16	6,783	316	610	93	7,931	4,702	3,821	3,328	306,964	288,175	805,007 83	112	93,896 24	15,365 47

DOMINION Lands Sub-agencies—Work performed during the Departmental Year ending March 31, 1917.

Name of Sub-agent.	Sub-agency.	Period and Agency.	Applications for.			Applications for				Amounts Remitted to Land Offices.	Expenditure.		
			Homesteads.	Purchased Homesteads.	Pre-emption.	Patents.	Inspection.	Timber Permits.	Hay.		Salary.	Postage and Commission.	
										$ cts.	$ cts.	$ cts.	
Spicer, S. E.	Alsack		39	4	26	170	52		62	11,720 98	600 00	54 81	
Rennison, G. M.	Athabasca		65			161	48	39	58	1,700 86	780 00	23 20	
Ostigny, N	Bonnyville		75			48	5	20	75	1,104 54	420 00	15 59	
Binns, H. P.	Brooks		20	3	9	112	43			9,934 50	600 00	50 54	
Mercer, R. M	Castor		38	2	12	107	53		70	2,180 04	600 00	24 43	
Davidson, D	Daysland	Closed	3			3			4	60 10	250 00	3 94	10 M.
Walsh, J. J	Edson	8 months	23			12	13	2	18	274 40	200 00	6 15	
Brown, Alex	Entwistle		26			67	20	3	32	997 04	480 00	19 59	
Cusack, John	Empress		83	7	57	354	145	2	9	34,310 28	480 00	143 08	
Libby, J. J	Ft. Saskatchewan	10 months.	7			14	5	6	11	270 99	500 00	4 31	Closed.
McGowan, Jno	Frog Lake		28			56	12	14	7	290 50	300 00	6 37	
Wilson, W. C	Ft. McMurray		20				10		1	222 00	600 00	5 38	
Reid, W. J	Ft. St. John	10 months.	37			16	3	1	7	496 55	600 00	3 28	
Morden, A. L.	Ft. Vermilion	8 "	51				1	3	31	612 95	200 00	1 84	
Requier, E. E	Falher	3 "	1					3		10 75	150 00	0 60	
Gody, Jas. G	Golden		17			8	6	29		1,314 65	600 00	8 81	
Snowdon, Thos.	Grassy Lake		28	2	7	151	40			22,554 11	480 00	73 89	
Trenaman, J. C	Hanna		32	6	6	373	92		53	10,592 67	600 00	65 94	
Stewart, Jes	Innisfail	10 months.	7		1	19	5	3	15	1,035 36	500 00	9 50	" "
Montgomery, J	Innisfree	9 "	8			32	17		4	206 30	225 00	5 51	" "
Cameron, A. J	Lacombe	Acting	7		1	39	18	1	11	349 95	600 00	4 57	" "
Legoff, V	Lac la Biche		74			49	29	26	74	1,055 51	300 00	11 36	" "
Klein, O. P	Leduc	10 months.	13			3	7	6	24	352 45	400 00	9 63	" "
Holland, W. H	Lloydminster		16			44	17	9	13	401 15	600 00	11 09	" "
Whitaker, J. M.	Mosside		14			89	8	8	16	210 01	300 00	5 29	" "
Skaife, B	Munson	4 months.	5	1	2	14	34	1	13	164 35	200 00	2 96	" "
Rhodes, C. C	Macleod		18		1	25	20	39	22	8,955 08	600 00	39 30	" "
McLean, D. E.	Nanton	7 months.	2			12	4	5	1	54 45	175 00	1 73	" "
Meacham, W. R	Oyen		55	1	32	388	108		151	15,096 53	300 00	54 34	" "
Craig, R. A	Olds		5			18	8	3	8	239 75	600 00	12 55	" "
McDonald, S. A	Pine Creek		26	1		79	20	35	12	556 64	600 00	11 76	" "
Franks, T. W	Ponoka	6 months.	4	2		13	6		5	130 10	270 00	4 94	" "
King, Geo. A	Provost	11 "	80	10	22	218	80	12	42	3,834 56	495 00	75 05	" "

Saloway, Geo	Pouce Coupé		94			85	42	77	11	1,437 40	300 00	13 97	
Hankinson, R. T	Ry. Mt. House		37			72	5	44	11	1,149 78	420 00	12 86	
Lacey, J. E	Salmon Arm		24			7	13	12	3	811 25	600 00		
McDonald, J. S	Sedgewick		35		1	88	47		27	4,220 00	300 00	21 70	
Gray, W. B	Stettler		16	2	8	169	40	2	33	2,616 33	900 00	19 28	
Fildes, J. W	Spirit River	4 months.	8			5	4	29		302 05	167 70	7 10	
Racicot, B	St. Paul de Metis		93			169	33	82	63	1,544 11	600 00	15 40	
Laplante, J. R	St. Lina		26			63	23	24	10	426 18	300 00	6 65	
Garrick, W. H. S	Trochu		2			54	11		4	98 15	300 00	3 78	
Wilson, F	Vegreville		2			29	24	3	20	144 60	600 00	9 50	
Flood, A. J	Vulcan		6	1		128	10	3	2	5,666 44	300 00	22 99	
Mace, Job	Vermilion		27			108	39	7	30	589 85	720 00	5 78	
Spencer, T. E	Wetaskiwin	Acting	16			18	9	26	5	381 71	600 00	9 37	
McAlphine, C. D	Whitecourt		14	1		53	4	2	3	107 25	300 00	5 19	
McLeod, H. W	Wainwright		38	4		105	25		13	1,019 60	300 00	10 70	
Laight, E. V	Wabamun		17			52	9	1	7	217 25	300 00	8 21	
Hughson, W. S	Whitford		29			77	27	7	4	426 05	600 00	8 55	
Alton, B. C	Westlock		48			125	46	57	46	1,242 05	420 00	17 79	
Snell, F. E	Youngstown		48	5	25	542	207		72	8,792 80	480 00	66 69	
Wenham, Mark	Yeoford		14			49	3	15	14	132 65	300 00	6 78	
			1,521	52	210	4,692	1,550	692	1,227	162,615 00	23,412 70	1,043 62	

REPORT OF THE INSPECTOR OF DOMINION LANDS AGENCIES, BRANDON, MAN.

Attached hereto you will find statements of the work performed by the Dominion Lands agencies, Dominion Lands sub-agencies, and homestead inspectors.

There are at present twelve agencies, those at Brandon, Regina and Estevan having been closed during the past year, and the one at The Pas having been opened recently; forty sub-agencies, and thirty-six homestead inspectors assigned to this office, all within the provinces of Manitoba and Saskatchewan. All the agencies and sub-agencies have been inspected as often as seemed necessary during the year, and the various officials have performed their duties in a satisfactory manner.

A number of matters have been referred to me for investigation during the year, and inquiries have been held and reported upon.

O. NEFF,
Inspector Dominion Lands Agencies.

Dominion Lands Agencies—Manitoba and Saskatchewan—Principal Transactions for the Departmental Year enging March 31, 1917.

Agencies.	Homestead Entries Granted.	Land Sales.			S. A. Scrip.	Applications for Patent Received.	Land Entries Cancelled.	Permits Issued.		Letters.		Revenue.	No. of Staff.	Expenditure.	
		Ordinary and School Lands.	Pre-emptions.	Purchased Homesteads.				Timber.	Hay.	Received.	Sent.			Salaries.	Disbursements.
												$ cts.		$ cts.	$ cts.
Battleford	518	32	23	18	....	993	443	243	815	27,986	27,569	100,551 49	9	9,224 84	1,940 00
Dauphin	1,005	22	.....	.....	....	376	427	256	533	27,261	21,150	29,387 03	8	9,395 00	820 12
Estevan	1	...	.....	.....	....	5	2	.....	81	690	373	1,121 29	3	549 98	22 75
Humboldt	334	22	.....	.....	....	517	215	75	594	14,740	15,571	38,939 68	5	6,011 72	663 56
Moose Jaw	547	21	232	28	....	2,492	586	13	796	60,168	47,154	758,365 77	14	12,162 39	3,563 41
Maple Creek	553	17	343	33	1	2,297	418	89	687	43,066	37,379	937,562 59	13	12,073 77	2,357 10
Prince Albert	747	67	1	1	....	751	400	579	666	28,082	31,060	97,277 47	22	25,508 31	926 48
Regina	6	3	...	.....	....	14	5	.....	153	1,575	1,569	1,697 71	4	743 32	40 00
Saskatoon	335	23	80	41	....	1,575	343	38	604	44,020	49,930	598,811 39	13	11,174 96	3,164 41
Swift Current	818	35	244	30	....	2,782	554	10	471	45,922	46,903	1,062,019 84	14	13,970 50	2,891 75
The Pas	.....	.....	.....	..	....	.....	.....	3	.....	476	676	413 75	4	516 71	341 71
Winnipeg	1,270	78	.....	..	....	667	746	.....	.....	23,591	30,734	52,018 41	16	17,847 48	2,330 42
Weyburn	200	6	87	6	....	462	217	6	471	14,690	13,008	97,363 84	5	4,914 92	506 30
Yorkton	380	33	...	....	....	420	215	55	364	12,046	13,724	43,359 69	5	5,322 60	608 59
Total for year 1916-1917	6,714	359	1,010	157	1	13,351	4,571	1,367	6,235	344,313	336,800	3,818,889 95	135	129,416 50	20,176 60
Total for year 1915-1916	10,212	378	1,699	219	....	11,819	7,365	1,907	6,768	377,799	354,366	1,183,740 21	137	135,250 74	16,532 10
Total for year 1914-1915	13,210	403	2,115	236	....	14,693	7,624	6,169	4,990	331,702	347,059	858,905 06	138	131,994 17	14,470 17

DOMINION Lands Sub-agencies—Manitoba and Saskatchewan—Work performed during the Departmental Year ending March 31, 1917.

Name.	Sub-agency.	Applications for							Amounts Remitted to Land Offices.	Expenditure.		Remarks.
		Homesteads.	Purchased Homesteads.	Pre-emptions.	Patent.	Inspector.	Timber Permits.	Hay Permits.		Salaries.	Postage and Commission.	
									$ cts.	$ cts.	$ cts.	
S. Einarsson	Arborg	24			21	8			455 00	300 00	4 52	
T. G. Ross	Assiniboia	128	6	69	561	332	3	100	15,653 81	600 00	66 45	
Mrs. M. Bucke	Brandon	108			8	9		6	1,515 75	1,288 33	17 06	
J. Roberts	Blaine Lake	61	2		74	38	34	92	1,242 92	600 00	17 18	
H. P. Turner	Biggar	54	6	7	258	104	89	74	5,461 24	600 00	58 97	
A. H. Bomford (Act.)	Canora	55			23	21	5	1	1,122 97	900 00	13 00	
A Robertson	Davidson	1			6	1			10 00	80 00	1 71	Office closed May 5, 1916.
Wm. Urton	Duck Lake	1			6	2		35	56 40	40 00	78	" April 29, 1916.
J. Cusack	Empress	71	3	38	418	86	8	13	8,819 22	480 00	45 63	
T. J. McGregor	Edam	45			133	27	1	40	994 90	450 00	8 79	Office closed January 9, 1917.
J. A. Tempelman	Estevan	13		2	17	10	2	30	2,169 50	916 60	17 27	Opened June 1, 1916.
Wm. Banks	Gull Lake	47	4	27	403	125		57	14,797 37	900 00	66 29	
J. Wiebe (Acting)	Herbert	28	3	7	313	66		82	2,276 05	900 00	40 35	Closed Sept. 16 to Oct. 16, 1916.
Geo. Gregg	Hanley	27	1	5	47	30		11	2,059 15	600 00	22 63	
Aaron Reid	Kerrobert	62	12	23	232	63		42	8,341 64	600 00	48 36	
G. H. Elliott	Kindersley	49	9	11	252	55	4	11	15,583 85	900 00	98 45	
W. H. Holland	Lloydminster	42			61	22	10	44	657 60	600 00	19 11	
W. L. Craddock	Lanigan							7	27 40	35 00	84	Office closed May 5, 1916.
R. Newth	Lipton	1			1			18	190 60	40 00	1 23	" May 19, 1916.
H. Hodges	Makinak	113			19	29	5	39	1,292 70	300 00	17 71	" Sept. 25, 1916.
J. T. McCordie	Meadow Lake						1		7 85	40 00	43	Office opened Feb. 24, 1917.
A. Featherstonhaugh	Macklin	14	6	3	128	27		1	11,911 83	600 00	37 08	
W. Young	Melfort	87			171	52	14	46	1,645 55	900 00	23 46	
W. Deans	N. Battleford	157			195	72	60	111	3,173 45	600 00	30 47	
J. J. McGurran	Nokomis	32			70	16		6	777 50	300 00	10 27	
S. Aarnason	Piney	4				3	1	13	63 45	50 00	1 22	Office closed May 11, 1916.
A. Liboiron	Ponteix	156	5	113	689	295		32	5,619 90	780 00	58 76	
E. C. Medland	Punnichy	21			39	31	2	27	612 70	300 00	13 58	
D. McMurphy	Preeceville	67			94	49	14	26	2,587 33	600 00	18 36	
R. S. Dundas	Pelly	41			13	28		28	539 30	250 00	6 70	Office closed Sept. 1, 1916.
V. W. Johnson	Rossburn	16			5	5			180 00	600 00	4 29	
R. C. Young	Regina	6			8	5		14	96 50	186 66	3 01	Opened 6/1/16. Closed 8/16/16.
E. St. G. Hodson	Rosthern	9			33	6	2	15	778 25	600 00	12 98	

B. T. Tucker	Ste. Rose du Lac	80	...	...	5	2	27	4	1,159 24	308 33	5 69	Office opened Sept. 26, 1916.
J. V. Ablett	Shaunavon	23	...	14	307	88	...	...	965 10	109 15	18 69	" Oct. 23, 1916.
J. H. Canham	Sprague	47	...	...	9	30	12	4	646 50	300 00	8 39	
S. G. Maddock	Shellbrooke	71	...	...	124	32	48	25	1,345 45	600 00	28 60	
A. E. Reid	Swan River	50	...	...	42	22	14	25	734 60	400 00	18 94	Closed Jan. and Feb., 1917.
W. M. Spencer	Sheho	16	...	...	69	13	1	42	568 25	300 00	10 31	
F. Barker	The Pas	13	...	...	1	...	5	9	2,621 50	750 00	39 12	Office closed Feb. 9/17.
Wm, Buxton	Tisdale	166	...	...	131	53	33	30	2,884 41	600 00	35 93	M. claims 313, Power-of-A. 118
S. Humphrey	Unity	60	3	16	134	47	4	55	2,432 80	600 00	20 77	Cert. of Work 27, Transfers 78.
D. S. Hughes	Turtleford	8	...	...	58	10	4	1	189 18	55 65	3 94	Office opened Jan. 25, 1917.
J. J. Gunn	Wilkie	19	3	1	56	25	...	17	2,090 17	600 00	18 70	
Miss M. Langstaff	Wadena	74	...	...	150	50	3	29	1,004 15	780 00	22 56	
S. Lytwyn	Winnipegosis	44	...	...	1	6	9	47	654 95	300 00	13 55	
P. Lapointe	Willow Bunch	92	5	35	375	125	3	58	6,208 40	720 00	20 46	
F. N. Rowe	Wynyard	21	...	...	34	19	...	34	379 50	600 00	9 52	
O. Tisdale	Watrous	20	...	...	8	6	...	1	202 50	50 00	2 31	Office closed June 1, 1916.
J. D. Murdoch	Zealandia	20	4	4	48	30	...	4	2,669 08	450 00	18 14	" Sept. 15, 1916.
Totals		2,364	72	375	5,850	2,175	418	1,406	137,468 46	24,459 72	1,082 56	
Compared with 1915-16		3,986	82	630	5,314	2,631	768	1,635	91,492 60	25,467 50	885 19	
Compared with 1914-15		5,015	91	684	7,361	2,506	1,452	738	99,599 46	24,810 00	989 34	

STATEMENT showing principal work performed by Homestead Inspectors in Manitoba and Saskatchewan, for Departmental Year ending March 31, 1917.

Name.	Headquarters.	Land Inspections Made.	Applications for Patent Made.	Miles Travelled.		Travelling Expenses for Self and Team.	Salaries.	Remarks.
				Wagon.	Rail.			
						$ cts.	$ cts.	
D. Anderson	Battleford	163	78	5,296	513	977 90	1,300 00	
A. C. Dewar	"	214	42	5,587	690	1,262 00	1,300 00	
A. C. Elliott	"	124	50	3,642	3,152	791 19	1,300 00	On Seed Grain Nov. and Dec.
G. L. Speer	Dauphin	163	113	5,068	1,916	1,061 45	1,500 00	On Seed Grain Oct.
T. Martin	"	119	73	2,625	4,967	1,183 01	1,200 00	
Thos. Secord	"	206	17	3,771	91	991 79	1,200 00	
Geo. McGowan	"	391	135	5,185	3,320	1,257 85	1,300 00	
A. Smyth	Humboldt	382	54	6,987	1,879	1,009 30	1,200 00	On Seed Grain Oct., Nov. and Dec.
A. L. Roth	"	130	50	2,770	1,553	731 18	1,200 00	" " " "
R. Dickson	Moose Jaw	75	42	1,996	5,235	891 15	1,200 00	Transferred from Regina June, 1916,
W. Erratt	"	157	41	2,900	1,307	853 50	1,200 00	
J. G. Rathwell	"	137	15	1,345	170	316 00	400 00	Resigned Aug. 1st., 1916.
W. J. Monkton	"	148	128	3,444	6,095	1,305 95	1,200 00	
A. Hamilton	"	52	26	942	3.174	765 02	800 00	Appointed July 18th, 1916. On S.G. Oct.
W. S. Jones	Maple Creek	165	360	3,749	622	924 90	1,200 00	
Peter McLaren	"	93	321	4,319	2,350	1.107 04	1,200 00	On Seed Grain Oct., Nov., Dec. and Jan.
Wm. Steer	"	32	149	1,389	12	545 18	1,200 00	" " July, Sept. to Jan.
Wm. Morrison	Prince Albert	198	33	4,407	5,021	1,346 54	1,200 00	Transferred from Estevan May 11/16. S. G. Oct. and Nov.
D. L. Burgess	"	36		709		152 80	216 66	Resigned June 5, 1916.
J. B. Boucher	"	213	1	4,337	268	1,165 00	1,200 00	
J. F. McKenzie	"	207	30	4,141	1,505	1,249 85	1,200 00	
J. Pearce	"	105		1,603	1,010	507 80	600 00	Appointed Aug./16. Resigned Feb. 21/17,
C. J. Ouelette	Regina	33	18	624	1,687	254 40	324 99	Transferred to Medicine Hat June 30/16.
F. M. Collins	Saskatoon	115	27	3,408	2,528	1,152 32	1,200 00	On Seed Grain Oct. to Feb.
J. A. Balfour	"	130	114	2,859	6,863	1,357 21	1,500 00	
A. E. Mosses	"	95	145	3,935	1,188	935 96	1,200 00	On Seed Grain Oct. to Jan.
C. E. Barr	"	105	26	2,235	2,226	836 40	1,200 00	" Oct. to Mar.
F. J. Bigg	Swift Current	142	121	2,405	1,377	772 61	1,200 00	Transferred from Prince Albert May 11/16. G. S. Oct.-Jan.
J. Furniss	"	91	71	4,246	1,020	1,064 80	1,200 00	
S. Lee	"	128	131	3,059		666 75	1,200 00	On Seed Grain Oct. to Feb. 5.
E. J. Hober	Weyburn	166	140	3,757	4,332	1,316 30	1,200 00	On Seed Grain Oct. to Jan.
Geo. Dickin	"	50	594	3,202	13,102	1,632 79	1,300 00	" Oct. to Dec.

Louis Lepine	Winnipeg	185	15	1.897	3,622	1,068 15	1,200 00	On Seed Grain Oct. and Nov.
W. D. Gillespie	"	297	47	4,099	2,823	1,127 33	1,300 00	" " "
W. Lagimodiere	"	450	72	3,891	3,548	1,656 10	1,560 00	
Paul Reykdal	"	648	209	6,141	3,066	1.179 30	1,300 00	
H. L. Mabb	"	468	108	4,394	2,764	995 33	1,200 00	
Adolph Henke	Yorkton	187	28	5,345	1,322	1.091 82	1,200 00	On Seed Grain Oct. and Nov.
R. J. M. Parker	"	201	181	5,249	2,420	1,182 34	1,200 00	" Oct. to Dec.
Total		7,001	3,805	136,958	98,678	38,686 31	44,841 65	
Compared with 1915-16		7,266	3,553	152,089	102,462	42,320 17	49,208 30	
Compared with 1914-15		9,173	4,751	167,632	117,878	43.815 19	49,858 31	

REPORT OF THE AGENT OF DOMINION LANDS, BATTLEFORD, SASKATCHEWAN.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homestead entries	518	$ 5,160 00	
Pre-emption entries	23	230 00	
Purchased homestead entries	18	180 00	
Improvements	81	4,109 75	
Land sales	32	1,379 73	
Pre-emption payments	176	54,178 60	
Purchased homestead payments	85	12,724 77	
Searches	415	78 75	
Applications for patents	993	.....	
" cancellations	256	.....	
Entries cancelled	443	.....	
Transfer	1	33 00	
Total			$78,074 60
Timber and Grazing Branch—			
Timber permits	249	$ 311 85	
" seizures	56	274 42	
Hay permits	319	823 45	
" seizures	4	2 05	
Grazing rentals	244	1,118 93	
Total			2,530 70
Forestry Branch—			
Timber permits	260	$224 45	
" seizures, excess	13	19 75	
" seizures	1	48 20	
Grazing rentals	83	573 45	
Trespass	22	3 50	
Hay dues	24	65 50	
Total			934 85
Mining Lands and Yukon Branch—			
Mining fees	3	$12 50	
Rental	1	10 24	
Total			22 74
School Lands Branch—			
Timber permits	2	$ 3 25	
" seizures	1	2 00	
Hay permits	514	1,035 60	
" seizures	14	8 30	
Grazing rentals	165	1,861 90	
Total			2,911 05
Miscellaneous—			
Seed grain and provision payments	220	$115,911 45	
Sundries	6	166 10	
			16,077 55
Total			$100,551 49

General—	
Letters received	26,986
" written	27,569

L. P. O. NOEL,
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, CALGARY, ALBERTA.

Statement showing the business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homestead fees	511	$ 5,110 00	
Pre-emption fees	160	1,600 00	
Purchased homesteads	34	340 00	
Improvements	200	11,159 23	
Land sales	20	5,398 90	
Pre-emption payments	1,251	316,575 07	
Purchased homestead payments	227	34,266 71	
Searches, etc	371	92 75	
Applications for patents	2,404	.....	
" cancellations	651	.....	
Entries cancelled	564	.....	
Total			374,542 66
Seed Grain Branch—			
Seed grain and provision payments	2,029	217,203 77	
Total			217,203 77
Timber and Grazing Branch—			
Ground rent	33	$1,766 67	
Royalty on sales	46	9,413 35	
Timber permits	221	5,461 02	
" seizures	25	2,908 75	
Hay permits	25	43 10	
Grazing rentals, cash	327	4,856 37	
Sundries	7	130 03	
Total			24,579 29
Forestry Branch—			
Permit fees and rental	118	$8,707 00	
Seizures	4	58 50	
Grazing rent	41	961 51	
Hay dues, etc	15	81 05	
Total			9,808 06
Irrigation Branch—			
Sales	8	$1,109 59	
Reservoir rental	1	246 76	
Total			1,356 35
Mining Lands and Yukon Branch—			
Mining fees (quartz and placer)	115	$ 415 00	
Rental (coal)	181	23,498 65	
Royalty	94	12,431 02	
Petroleum and natural gas	25	1,025 33	
Quarry	1	5 00	
Coal land sales	2	865 00	
Sundries	2	1 00	
Total			38,241 00
School Lands Branch—			
Timber permits	1	$ 14 74	
Hay permits	579	1,219 45	
Grazing rentals	469	8,271 14	
Coal rental	19	1,308 40	
" royalty	2	29 70	
Total			10,843 43
Grand total			$676,574 56
General—			
Letters received	69,630		
" written	63,135		

W. E. TALBOT,
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, DAUPHIN, MANITOBA.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homestead fees	1,005	$10,050 00	
Improvements	93	2,251 45	
Land sales	21	1,108 08	
Searches	351	87 75	
Applications for patents	376	.....	
" inspections	272	.....	
Entries cancelled	427	.....	
Sundries	1	10 00	
Total			$13,507 28
Timber and Grazing Crown Lands—			
Timber permits	252	$856 30	
" seizures	25	611 35	
Hay permit	283	614 73	
Grazing rentals	44	479 10	
Total			2,561 48
Forestry Branch—			
Timber permits	1,116	$7,007 89	
Permit fees and rental	33	165 00	
Seizures	84	1,361 97	
Grazing rent, etc	29	207 85	
Hay dues	207	396 35	
Total			9,139 06
Mining Lands—			
Mining fees	123	$615 00	
Assessment payments	2	200 00	
Sundries	137	390 00	
Total			1,205 00
School Lands—			
Annual sales	1	$165 60	
Timber permits	4	19 95	
Hay permits	250	466 45	
Grazing rentals	37	654 95	
Timber seizure	5	39 25	
Cultivation permits	1	4 00	
Total			1,350 20
Seed Grain—			
Seed grain	56	1,620 99	
Total			1,620 99
Total			$29,384 01

General—

Letters received	24,976
" sent	19,701

E. WIDMEYER,
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, EDMONTON, ALBERTA.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homestead fees	1,859	18,460 00	
Pre-emption fees	4	40 00	
Purchased homestead fees	5	50 00	
Improvements	409	9,957 96	
Lands sales cash	138	7,635 80	
Pre-emption payments	19	2,384 72	
Purchased homestead payments	21	2,705 06	
Office fees, etc	175	43 75	
Applications for patents recommended	1,904	.....	
" inspections received	919	.....	
Entries cancelled	1,604	.....	
Sundries	4	24 00	
Total			$41,301 29
Timber and Grazing Branch—			
Bonus	....	$ 8,454 67	
Ground rent	51	2,606 89	
Royalty on sales	63	19,976 96	
Timber permits	1,187	7,660 76	
" seizures	74	11,175 20	
Hay permits	618	950 00	
Grazing rents, cash	110	444 86	
Fireguarding	4	291 97	
Sundries	614	32,926 82	
Total			84,488 13
Forestry Branch—			
Timber dues	21	$1,574 49	
Permit fees and rental	39	15 00	
Seizures	4	212 85	
Grazing rent, etc	33	143 60	
Hay dues, etc	33	117 35	
Total			2,063 29
Mining Lands and Yukon Branch—			
Mining fees	39	$ 122 00	
Rental	54	14,070 26	
Royalty	33	17,375 80	
Assessment payments	5	500 00	
Sundries	263	36,003 22	
Total			68,071 28
School Lands Branch—			
General sales	3	$2,518 42	
Timber permits	16	76 00	
Hay permits	527	913 93	
Grazing rentals	187	2,183 07	
Coal rental	11	314 30	
Sundries	92	4,102 20	
Total			10,107 92
Miscellaneous—			
Re-payments	428	13,430 46	
Total			13,430 46
Grand total			$219,462 37

General—	
Letters received	57,917
" written	78,388

A. NORQUAY,
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, GRANDE PRAIRIE, ALBERTA.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Lands Patents Branch—			
Homestead fees	836	$8,360 00	
Improvements	88	3,020 87	
Land sales	30	2,418 72	
Patent and interchange fees	4	40 00	
Searches	7	1 75	
Applications for patents	409	.....	
" inspections	172	.....	
Entries cancelled	272	.....	
Total			$13,841 34
Timber and Grazing Branch—			
Timber permits	410	$683 65	
" seizures	2	93 20	
Hay permits	206	461 60	
Grazing rentals	33	331 73	
Timber excess	33	102 65	
Hay excess	5	5 50	
" lease rent	1	20 00	
Total			1,698 33
Mining Lands and Yukon Branch—			
Mining fees	1	$ 5 00	
Rentals	2	49 05	
Royalty	10	21 76	
Coal permits	1	7 50	
Total			83 31
School Lands Branch—			
Hay permits	39	$ 80 00	
Grazing rentals	38	606 41	
Total			686 41
Seed Grain and Provision Repayments	36	.....	1,697 02
Grand total			$18,006 41
General—			
Letters received	9,645		
" written	8,515		

J. J. E. CLARKE,
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, HIGH PRAIRIE, ALBERTA.

This office was moved from Grouard to High Prairie, Alta., December 1, 1916. We are now on a line of railway, and this will facilitate the transaction of business for the general public.

The crops in this district were very good last year, with the exception of High Prairie and Falher, which points were affected by frost. There was more land under cultivation in 1916 than in 1915 and this year there will be another third more, and should the crops prove successful, this will add to the prosperity of the settlers in this Northern country.

The following is a statement of the business transacted during the fiscal year, ending March 31, 1917:—

	Number.	Revenue.	Total.
Lands Patents Branch—			
Homestead fees	70	$700 00	
Improvements	13	380 00	
Land sales, cash	5	395 05	
Searches	2	0 50	
Applications for patents	31	.....	
" inspections	23	.....	
Entries cancelled	41	.....	
Total			$1,475 55
Timber and Grazing Branch—			
Timber permits	42	$92 50	
Hay permits	31	74 80	
Grazing rentals, cash	6	23 10	
Excess dues on hay and timber permits	23	77 82	
Total			268 22
Mining Lands and Yukon Branch—			
Royalty, coal	1	$1 90	
Total			1 90
School Lands Branch—			
Hay permits	4	$10 00	
Grazing rentals, cash	7	65 10	
Cultivation permit	1	4 60	
Total			79 70
Miscellaneous—			
Seed grain repayments	2	$27 40	
Total			27 40
Grand total			$1,852 77
Letters received	2,357		
" written	3,908		

W. F. W. CARSTAIRS.
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, HUMBOLDT, SASKATCHEWAN.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homestead fees	334	$3,340 00	
Improvements	72	2,549 50	
Land sales	22	1,510 69	
Searches, etc.	216	53 75	
Applications for patents received	454	.....	
" inspections	149	.....	
Entries cancelled	197	.....	
Total			$7,453 94
Timber and Grazing Branch—			
Timber permits	69	$ 51 70	
" seizures	6	49 60	
Hay permits	170	291 15	
Grazing rentals	55	216 20	
Timber excess dues	3	4 51	
Hay excess dues	4	2 40	
			615 56
School Lands Branch—			
Timber permits	6	$ 82 75	
Hay permits	424	742 65	
Grazing rentals	258	2,405 14	
Timber seizures	1	10 00	
Hay excess dues	15	8 35	
Total			3,248 89
Seed Grain—			
Seed grain repayments	380	$27,621 29	
Total			27,621 29
Grand total			$38,939 68

General—	
Letters received	14,740
" written	14,571

R. GEO. MACKEY,
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, KAMLOOPS, B.C.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homesteads	170	$1,670 00	
Improvements	95	5,732 04	
Land sales	26	2,775 05	
Ground rent	1	10 00	
Searches	162	61 60	
Applications for patents	114	.....	
" inspections	79	.....	
Homestead entries cancelled	62	.....	
Total			$10,248 69
Timber and Grazing Branch—			
Ground rent	52	$2,515 83	
Royalty	21	5,874 90	
Timber permits	377	2,565 49	
" seizures	2	13 30	
Hay permits	11	10 30	
Grazing rentals	435	6,916 99	
Registration fees	20	40 00	
Fire-guarding collections	7	71 73	
Total			18,008 54
Forestry Branch—			
Timber dues	15	$133 54	
Permit fees	24	6 00	
Rentals	3	147 40	
Hay dues	6	12 70	
Total			299 64
Mining Lands Branch—			
Mining fees	7	$ 35 00	
Rental	9	281 88	
Permits	1	50	
Total			317 38
Miscellaneous—			
Seed grain collections	21	$394 60	
Total			394 60
Grand total			$29,268 85
Letters received	12,091		
" written	11,440		

W. C. COWELL,
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, LETHBRIDGE, ALBERTA.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue	Total.
Patent Branch—			
Homestead fees	156	$ 1,560 00	
Pre-emption fees	33	330 00	
Purchased homestead fees	11	110 00	
Improvements	88	3,301 40	
Land sales, cash	30	3,577 40	
Pre-emption payments	769	211,298 33	
Purchased homestead payments	44	6,505 94	
Searches, map sales, office fees, etc.	102	30 70	
Applications for patents received	751	.....	
" inspections received	143	.....	
Entries cancelled	187	.....	
Sundries—Registration fees	2	4 50	
Total			$226,718 27
Timber and Grazing Branch—			
Timber permits	74	$ 62 20	
Hay permits	2	1 00	
Grazing rsentals, cash	248	3,027 06	
Sundries	3	6 00	
Total			3,096 26
Forestry Branch—			
Permit fees and rental	120	$ 492 27	
Seizures	4	260 19	
Grazing rent	60	1,901 82	
Hay dues	12	25 10	
Total			2,679 38
Irrigation Branch—			
Sales	1	$59 65	
Total			59 65
Mining Lands and Yukon Branch—			
Mining fees	65	$ 515 00	
Rental	102	9,064 03	
Royalty	51	6,785 15	
Sundries	12	24 00	
Total			16,388 18
School Lands Branch—			
General sales	17	$9,815 03	
Timber permits	1	329 68	
Hay permits	45	45 80	
Grazing rentals	124	1,830 95	
Mining fees	8	40 00	
Petroleum, gas and coal rental	14	871 84	
Coal royalty	4	55 79	
Total			12,989 09
Miscellaneous—			
Seed grain and provision payments	3,565	$387,519 86	
Total			387,519 86
Grand total			$649,450 69

General—	
Letters received	35,451
" written	36,797

J. A. REID,
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, MAPLE CREEK, SASKATCHEWAN.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homestead fees	553	$ 5,500 00	
Pre-emption fees	343	3,410 00	
Purchased homestead fees	33	330 00	
Improvements	122	6,669 85	
Land sales, cash	18	1,802 58	
Pre-emption payments	1,203	380,200 94	
Purchased homestead payments	190	30,410 86	
Searches, map sales, office fees, etc.	1,388	347 00	
Applications for patents received	2,301		
" inspections	571		
Entries cancelled	418		
Total			$428,671 23
Timber and Grazing Branch—			
Excess hay	4	$ 3 25	
Improvements	3	169 00	
Timber permits	89	22 25	
Hay permits	222	299 70	
Grazing rentals, cash	1,374	16,305 80	
Timber dues	1	75	
Total			16,800 75
Forestry Branch—			
Timber dues	....	$168 70	
Permit fees and rental	185	46 25	
Seizures	1	2 00	
Excess timber	1	2 50	
Hay dues, etc.	18	170 95	
Total			390 40
Irrigation Branch—			
Lease	1	$ 43 52	
Sales	18	3,739 74	
Total			3,783 26
Mining Lands and Yukon Branch—			
Mining fees	6	$ 30 00	
Rental	11	261 70	
Royalty	7	40 05	
Coal permits	1	10 05	
Total			341 80
School Lands Branch—			
Hay permits	465	$ 554 35	
Grazing rentals	194	3,886 77	
Tenders for hay	....	1 35	
Excess, hay	9	5 80	
Total			4,448 27
Miscellaneous—			
Seed grain and provision repayments	3,439	$483,126 88	
Total			$483,126 88
Grand total			$937,562 59
General—			
Letters received	43,066		
" written	38,379		

C. H. STOCKDALE,
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, MEDICINE HAT, ALBERTA.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homestead fees	445	$ 4,450 00	
Pre-emption fees	230	2,300 00	
Purchased homestead fees	38	380 00	
Improvements	168	7,930 13	
Land sales, cash	8	794 02	
Pre-emption payments	758	226,094 65	
Purchased homestead payments	110	16,572 65	
Searches, map sales, office fees, etc.	276	69 00	
Applications for patents received	1,442	.....	
" inspections received	644	.....	
Entries cancelled	557	.....	
Total			$258,590 45
Timber and Grazing Branch—			
Timber permits	13	$ 6 25	
Hay permits	146	101 85	
Grazing rentals, cash	973	21,812 16	
Sundries	8	179 00	
Total			22,099 26
Forestry Branch—			
Timber dues	68	$173 02	
Permit fees and rental	135	33 75	
Seizures	3	25 00	
Hay dues, etc	30	149 75	
Total			381 52
Irrigation Branch—			
Sales	25	$6,158 25	
Total			6,158 25
Mining Lands and Yukon Branch—			
Mining fees	6	$ 30 00	
Rental	11	352 61	
Royalty	23	162 72	
Assessment payments	2	10 00	
Assignment fees	1	2 00	
Petroleum and natural gas	8	147 20	
Total			704 53
School Lands Branch—			
General sales	11	$5,029 69	
Hay permits	113	117 90	
Grazing rentals	174	3,510 38	
Total			8,657 97
Miscellaneous—			
Seed grain and provision repayments	3,986	$382,013 11	
Total			382,013 11
Grand total			$678,605 09

General—	
Letters received	31,562
" written	37,318

GEO. H. MACDONELL,
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, MOOSEJAW, SASKATCHEWAN.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homestead fees	547	$ 5,470 00	
Pre-emption fees	232	2,320 00	
Purchased homestead fees	28	280 00	
Improvements	130	9,123 00	
Land sales, cash	19	1,327 71	
Pre-emption payments	1,254	375,566 21	
Purchased homestead payments	142	23,184 79	
Searches, etc	1,564	391 00	
Applications for patents	2,372	.....	
" inspections	478	.....	
Entries cancelled	461	.....	
Total			$417,662 71
Timber and Grazing Branch—			
Timber permits	8	$ 1 75	
" seizures	3	3 25	
Hay permits	37	68 00	
Grazing rentals, cash	504	4,756 84	
Total			4,829 84
Forestry Branch—			
Timber dues	293	$286 65	
Seizures	15	64 70	
Grazing rent	117	654 15	
Hay dues	60	230 85	
Total			1,236 35
Mining Lands and Yukon Branch—			
Mining fees	18	$ 90 00	
Rental	11	195 28	
Royalty	27	321 35	
Sundries	2	40 00	
Total			646 63
School Lands Branch—			
General sales	2	$1,033 60	
Timber permits	3	4 00	
Hay permits	750	1,646 70	
Grazing rentals	1,167	4,505 20	
Mining fees	1	5 00	
Coal rental	2	40 00	
Total			7,234 50
Miscellaneous—			
Seed grain and provision	4,225	324,735 74	
Total			324,735 74
Grand total			$756,345 77

General—	
Letters received	60,168
" written	47,154

G. K. SMITH,
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, NEW WESTMINSTER, BRITISH COLUMBIA.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homestead fees	46	$ 460 00	
Improvements	9	215 00	
Land sales	9	613 51	
Purchased homestead payments	59	1,420 20	
Applications for patents received	26	.....	
" inspections received	32	.....	
Entries cancelled	43	.....	
Sundries	3	50 00	
Total			$ 2,758 71
Mining Lands and Yukon Branch—			
Mining fees	181	$ 905 00	
Rental	220	11,036 92	
Sundries	3	6 00	
Total			11,947 92
Grand total			$14,706 63
Letters received	2,409		
" written	2,076		

W. D. MAGEE,
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, THE PAS, MANITOBA.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Timber and Grazing Branch—			
Timber permits	3	$26 25	
Mining Lands and Yukon Branch—			
Mining fees	146	387 50	
Total			$413 75
Letters received	476		
" written	676		

N.B.—This agency was opened February 9, 1917.

F. BARKER,
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, PEACE RIVER, ALBERTA.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homestead entries	423	$4,230 00	
Improvements	46	1,862 00	
Land sales	23	1,495 27	
Searches	6	1 50	
Assessment names	124	1 24	
Total			$ 7,590 01
Applications for patents received	205	.....	
" inspections	73	.....	
Entries cancelled	175	.....	
Timber and Grazing Branch—			
Timber permits issued	426	$685 40	
" seizures	5	904 40	
Hay permits issued	135	249 90	
Grazing leases	38	297 89	
Total			2,137 59
School Lands Branch—			
General sales	1	$289 80	
Petroleum leases	15	823 34	
Hay permits issued	19	23 00	
Grazing permits	20	397 98	
Cultivation permits	1	11 50	
Total			1,545 62
Mining Lands and Yukon Branch—			
Petroleum leases	204	$11,772 63	
Coal permits	14	205 80	
Total			11,978 43
Seed Grain Branch—			
Seed grain collections	24	$541 33	
Total			541 33
Total receipts			$23,792 98
Letters received	5,691		
" written	6,859		

J. E. CARSON,
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, PRINCE ALBERT, SASKATCHEWAN.

This district has been particularly favoured in the past, having been least affected by the drought of 1914. Stock raising has considerably increased throughout this district, and a large number of new grazing leases have been applied for. Settlers are beginning to see more clearly the advantages of mixed farming, for which this district is particularly well adapted. Numerous inquiries have been received from outside points and especially from the United States *re* lands in this district, and this office has endeavoured to furnish the intending settlers with most reliable information.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue	Total.
Patent Branch—			
Homestead fees	737	$7,370 00	
Pre-emption fees	1	10 00	
Purchased homestead fees	1	10 00	
Improvements	117	3,122 85	
Land sales, cash	68	3,596 28	
Pre-emption payments	8	597 80	
Purchased homestead payments	8	606 71	
Searches, map sales, office fees, etc	204	51 00	
Applications for patents received	753	.....	
" inspections received	300	.....	
Entries cancelled	400	.....	
Total			$15,364 64
Timber and Grazing Branch—			
Ground rent	14	$ 7,278 27	
Royalty on sales	33	45,684 63	
Timber permits	561	7,504 85	
" seizures	44	4,778 76	
Hay permits	337	561 45	
Grazing rentals, cash	154	756 78	
Fire tax	....	301 71	
Total			66,866 45
Forestry Branch—			
Permit fees and rental	434	$2,638 93	
Seizures	12	194 95	
Grazing rent, etc	17	184 80	
Hay dues, etc	86	231 00	
Total			3,249 68
Mining Lands and Yukon Branch—			
Mining fees	385	$1,357 55	
Rental	1	3 00	
Total			1,360 55
School Lands Branch—			
Timber permits	18	$231 15	
Hay permits	330	645 35	
Grazing rentals	79	823 26	
Total			1,699 76
Miscellaneous—			
Seed grain and provision repayments	215	$8,736 39	
Total			8,736 39
Grand total			$97,277 47
General—			
Letters received	28,082		
" written	31,060		

R. M. TREEN,
Acting Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, RED DEER, ALBERTA.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homestead fees	....	$ 2,490 00	
Pre-emption fees	....	300 00	
Purchased homestead fees	....	220 00	
Improvement payments	....	4,357 63	
Land sales	....	2,119 62	
Pre-emption payments	....	32,312 29	
Purchased homestead payments	....	21,775 35	
Sundries	....	30 00	
Total			$63,604 89
Timber Grazing and Irrigation—			
Timber permits	....	$742 28	
" seizures	....	195 52	
Hay permits	....	306 10	
Grazing rentals	....	594 84	
Total			1,838 74
Forestry Branch—			
Timber permits	....	$90 50	
Grazing rental	....	26 40	
Total			116 90
Mining Lands and Yukon Branch—			
Mining royalty	....	$1,494 71	
" rental	....	2,307 47	
" fees and sundries	....	102 00	
Total			3,904 18
School Lands Branch—			
Timber permits	....	$ 27 25	
Hay permits	....	909 77	
Grazing rental	....	3,711 80	
Coal royalty	....	64 65	
Coal rental	....	259 90	
Mining fees and sundries	....	34 50	
Total			5,007 87
Seed Grain—			
Seed grain payments	162	$13,899 27	
Total			13,899 27
Grand total			$88,351 85
Letters written	16,511		
" received	25,522		

P. PIDGEON,
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, REVELSTOKE, B.C.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homestead fees	51	$ 510 00	
Improvements	39	1,596 87	
Land sales	2	85 00	
Townsite payments	10	350 02	
Purchased homestead payments	3	61 88	
Searches, map sales, etc	67	22 10	
Sundries	5	21 60	
Applications for patents	14	.....	
" inspections	14	.....	
Entries cancelled	35	.....	
Total			$2,647 47
Timber and Grazing Lands Branch—			
Bonus on timber	1	$ 2,100 00	
Ground rents	73	2,370 04	
Royalties	25	25,571 79	
Timber permits	111	518 75	
" seizures	1	10 50	
Grazing rentals	2	6 40	
Fireguarding	3	211 83	
Sundries	2	150 94	
Total			30,940 25
Mining Lands and Yukon Branch—			
Rentals	1	$40 35	
Total			40 35
Total			$33,628 07
General—			
Letters received	11,068		
" written	12,760		

T. J. WADMAN,
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, SASKATOON, SASKATCHEWAN.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homestead fees	335	$ 3,340 00	
Pre-emptions	80	800 00	
Purchased homestead fees	41	410 00	
Improvements	98	5,268 00	
Land sales, cash	39	2,780 20	
Pre-emption payments	479	145,302 62	
Purchased homestead payments	374	56,269.69	
Searches, etc.	888	222 00	
Applications for patents	1,516	.....	
" inspections	307	.....	
Entries cancelled	300	.....	
Total			$214,392 51
Timber and Grazing Lands Branch—			
Timber permits	38	$ 76 50	
Hay permits	72	458 95	
Grazing rentals	78	226 48	
Sundries	1	0 25	
Total			762 18
Forestry Branch—			
Timber dues	64	$ 30 50	
Permit fees and rental	4	1 00	
Seizures	2	1 25	
Grazing rent, etc.	17	281 25	
Hay dues, etc.	14	23 20	
Total			337 20
Mining Lands and Yukon Branch—			
Royalty	1	$ 23 35	
Coal permits	2	70 00	
Sundries	57	6,246 73	
Total			6,340 08
School Lands Branch—			
General sales	1	$1,929 42	
Hay permits	532	1,157 60	
Grazing rentals	180	1,978 83	
Sundries	7	210 40	
Total			5,276 25
Miscellaneous—			
Seed grain and provision	3,628	$371,702 67	
Total			371,702 67
Grand total			$598,810 89
Letters received	44,020		
" written	49,630		

L. C. PATERSON,
Acting Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, SWIFT CURRENT, SASKACHEWAN.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homestead fees	494	$ 4,940 00	
Pre-emption fees	244	2,440 00	
Purchased homestead fees	30	300 00	
Improvements	92	8,288 95	
Land sales, cash	35	7,317 18	
Pre-emption payments	1,348	443,345 13	
Purchased homestead payments	167	30,210 24	
Searches, map sales, etc.	1,438	359 50	
Applications for patents received	2,782	.....	
" inspections received	520	.....	
Entries cancelled	554	.....	
Total			$497,201 00
Timber and Grazing Lands Branch—			
Timber permits	10	$ 2 50	
Hay permits	77	136 60	
Grazing rentals, cash	346	5,379 42	
Sundries	2	2 30	
Total			5,520 82
Forestry Branch—			
Grazing rent	26	$256 20	
Hay dues	22	58 60	
Total			314 80
Irrigation Branch—			
Sales	5	$1,199 40	
Total			1,199 40
Mining Lands and Yukon Branch—			
Mining fees	2	$10 00	
Rental	1	5 00	
Royalty	2	1 60	
Coal permits	2	(Free.)	
Sundries	1	2 00	
Total			18 60
School Lands Branch—			
Hay permits	394	$ 537 80	
Grazing rentals	307	4,459 87	
Sundries	6	3 75	
Total			5,001 42
Miscellaneous—			
Seed grain and provision repayments	2,927	$552,763 80	
Total			552,763 80
Grand total			$1,062,019 84

General—	
Letters received	45,922
" written	46,964

S. LEE,
Acting Agent of Dominion Lands.

REPORT OF THE DOMINION LANDS AGENT, WEYBURN, SASKATCHEWAN.

Statement showing the business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homestead fees	200	$ 2,000 00	
Pre-emption fees	87	870 00	
Purchased homestead fees	6	60 00	
Improvements	63	4,707 60	
Land sales, cash	6	675 27	
Pre-emption payments	215	56,937 34	
Purchased homestead payments	38	6,217 28	
Searches, etc	393	98 25	
Applications for patents	462	.....	
" inspections	179	.....	
Entries cancelled	217	.....	
Total			$71,565 74
Timber and Grazing Lands Branch—			
Timber permits	3	$ 0 75	
Hay permits and excess	86	226 60	
Grazing rentals, cash	104	547 20	
Sundries	1	2 00	
Total			776 55
Forestry Branch—			
Permit fees and rental	1	$ 0 50	
Timber	2	7 00	
Hay	2	5 05	
Excess	16	33 75	
Hay	26	60 05	
Total			106 35
Mining Lands and Yukon Branch—			
Mining fees, coal	16	$ 80 00	
" clay	1	5 00	
Rental, coal	20	417 55	
Royalty, clay	1	40 00	
" coal	38	1,451 94	
Sundries	1	100 00	
Total			2,094 49
School Lands Branch—			
Timber permits	3	$ 1 75	
Hay permits and excess	385	831 65	
Grazing rentals	104	1,291 85	
Mining fees	1	5 00	
Coal rental	4	103 60	
Royalty	5	653 75	
Total			2,887 60
Miscellaneous—			
Seed grain and provision repayments	327	$19,933 11	
Total			19,933 11
Grand total			$97,363 84
Letters received	1,351		
" written	1,253		

S. C. MURRAY,
Agent of Dominion Lands.

REPORT OF AGENT OF DOMINION LANDS, WINNIPEG, MANITOBA.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homestead entries	1,270	$12,700 00	
Improvements	242	10,037 81	
Land sales, cash	60	6,251 01	
Searches, maps, etc.	824	390 15	
Seed grain	429	9,819 23	
Total			$39,198 20
Timber and Grazing Lands Branch—			
Grazing rentals	78	$374 24	
Total			374 24
Mines Branch—			
Mining fees	1,465	$6,581 65	
Rentals	51	1,107 52	
Quarries	14	55 00	
Petroleum and gas	12	535 63	
Total			8,279 80
School Lands Branch—			
Sales	18	$3,184 67	
Grazing rentals	73	981 50	
Total			4,166 17
Grand total			$52,018 41

General—	
Applications for patents received	667
" inspections	507
Entries cancelled	746
Letters received	21,307
" written	27,482

L. RANKIN,
Agent of Dominion Lands.

REPORT OF THE AGENT OF DOMINION LANDS, YORKTON, SASKATCHEWAN.

Statement of business transacted during the fiscal year ending March 31, 1917:—

	Number.	Revenue.	Total.
Patent Branch—			
Homestead entries	380	$3,800 00	
Improvements	14	1,573 25	
Land sales	15	862 30	
Searches, etc.	114	28 50	
Total			$6,264 05
Timber and Grazing Branch—			
Timber permits	54	$123 90	
" seizures	3	319 75	
Hay permits	92	201 10	
Grazing rentals	13	53 60	
Total			698 35
Forestry Branch—			
Timber dues	121	$465 21	
Permit fees and rentals	57	26 25	
Seizures	6	59 95	
Grazing rentals	14	189 65	
Hay dues	69	324 10	
Total			1,065 16
School Lands Branch—			
General sales	18	$9,755 79	
Timber permits	1	200 50	
Hay permits	272	431 40	
Grazing rentals	73	637 90	
Total			11,025 59
Miscellaneous—			
Seed grain and relief repayments	438	$24,306 54	
Total			24,306 54
Grand total			$43,359 69
Applications for patents	420		
" inspections	218		
Entries cancelled	215		
Letters received	12,046		
" written	13,724		

J. A. DUNCAN,
Agent of Dominion Lands.

REPORT OF THE MINING LANDS AND YUKON BRANCH.

The total revenue of this branch, derived from all sources during the fiscal year, amounts to $612,928.06, being an increase of $125,956.99 over the previous year. Owing to conditions resulting from the war it has been found necessary to grant, in a number of cases, extensions of time within which to pay the rental of mining locations acquired under lease.

The statements lettered "A" and "B," showing in different forms how the revenue is made up, will be found at the end of this report. The statement lettered "A" shows the total revenue for each month, and the statement lettered "B" shows the revenue collected at each agency, including the Yukon Trrritory.

The revenue for the Yukon Territory for the year amounts to $174,565.92.

The reports and statements for the fiscal year from the Administrator, the Gold Commissioner, Crown Timber and Land Agent, the Comptroller, the Assistant Gold Commissioner at Whitehorse, and the Inspecting Engineer will be found under this part of the report.

TIMBER IN THE YUKON TERRITORY.

The total amount of dues collected on account of timber in the Yukon Territory during the fiscal year was $14,560.48. During the year 163 permits were issued, under the authority of which 398,502 feet (board measure) of timber and 22,317½ cords of wood were cut. The dues collected on permits issued amounted to $11,353.57.

There are in existence 93 timber berths held under license to cut timber within the territory, covering an area of 185·61 square miles, which licenses were granted prior to May 10, 1906, on which date the regulations governing the granting of licenses to cut such timber in the territory were rescinded, and regulations for the issue of permits to cut timber substituted therefor.

According to returns received in the department, the number of feet (board measure) of lumber manufactured under license during the year, and sold, was 79,408. Seizure dues, amounting to $644.50, were collected on 757 cords of wood cut in trespass. This does not include the very large amount of timber and cordwood cut free of dues for mining purposes.

MINING LANDS OTHER THAN COAL.

During the fiscal year, 967 entries for quartz-mining claims and seven entries for placer-mining claims were granted by the mining recorders in Manitoba, Saskatchewan and Alberta, and by the mining recorder for unorganized districts.

According to the returns received from the Yukon Territory during the fiscal year, 143 entries for placer-mining claims, 218 entries for quartz-mining claims, and 3,982 renewals and relocations were recorded during that period. The revenue collected from these sources and from fees for registering documents in connection with mining operations was $47,673.

ROYALTY ON GOLD MINED IN THE YUKON TERRITORY.

The total amount collected up to March 31, 1917, for royalty on the output of placer-mining claims in the Yukon Territory, after deducting the exemption at one

time allowed under the regulations, was $4,582,970.09, of which amount $99,007.92 was collected during the last fiscal year. For the purpose of estimating this royalty, the gold is valued at $15 an ounce, which is much below its real value.

The actual value of gold produced from placer-mining operations in the Yukon Territory, up to March 31 last, might be safely placed at $148,070,285.

The statement lettered "D," at the end of this report, shows the total gold production, the total production subject to royalty, and the total royalty collected for each fiscal year from May 1, 1898, to March 31, 1917.

DREDGING.

Twenty-five leases to dredge for minerals in the beds of rivers in the Yukon Territory are now in force, covering a total frontage of 157·76 miles. The total revenue derived from this source up to March 31, 1917, amounts to $197,559.22, of which amount $1,317.91 was collected during the fiscal year just closed.

These dredging leases are confined to the Yukon, McQuesten, Fortymile, Big Salmon, Klondike and Sixtymile rivers.

There are in operation in the Yukon Territory eleven dredges. Most of these dredges are working on the Klondike river and tributaries, and are operated by hydro-electric motive power. Two of the largest gold-saving dredges in the world are now being operated most successfully on the Klondike river-flat.

Twelve leases to dredge for minerals in the submerged beds of rivers in the provinces of Alberta and Saskatchewan are now in force, covering a total frontage of 59 miles. Of these leases, four are in the province of Alberta and include 20 miles, and eight are in the province of Saskatchewan and include 39 miles. The total revenue derived from this source up to March 31, 1917, amounts to $46,056.15, of which amount $222.95 was collected during the past fiscal year.

HYDRAULIC MINING.

The Hydraulic Mining Regulations relating to the Yukon Territory were rescinded by an Order in Council, dated February 2, 1904, but leases already granted were not affected by such withdrawal.

There are still in force in the Yukon Territory seven hydraulic mining leases, covering an area of 15·27 square miles. Since the Hydraulic Mining Regulations were first established in December, 1898, forty-seven hydraulic mining leases have been issued, all of which have now been cancelled, with the exception of the above number.

HOMESTEADS IN THE YUKON TERRITORY.

Eighty-seven homestead entries in the Yukon Territory have been granted, of which seventy-two are now in force, comprising a total area of 11,096·21 acres. Patents have been issued for five homesteads.

PETROLEUM AND NATURAL GAS.

There are now in force under the regulations 2,694 petroleum and natural gas leases, embracing a total area of 1,073,114 acres, distributed as follows: In Manitoba, 9 leases, comprising 2,232 acres; in Saskatchewan, 78 leases, comprising 42,460 acres; in Alberta, 2,327 leases, comprising 951,355 acres; in British Columbia, 272

leases, comprising 68,107 acres; and in the Northwest Territories 8 leases, comprising 8,960 acres. The total revenue derived from petroleum lands during the year amounts to $91,973·93.

Natural gas has been discovered and is now being utilized for commercial and domestic purposes in different parts of the province of Alberta. Boring operations are being carried on throughout Alberta and Saskatchewan with a view to the further discovery.

QUARRYING.

The number of leases now in force, issued under the provisions of the regulations, is 305, distributed as follows: In Manitoba, 93 leases, comprising 2,840 acres; in Saskatchewan, 40 leases, comprising 1,266 acres; in Alberta, 121 leases, comprising 5,411 acres; and in British Columbia, 51 leases, comprising 1,582 acres.

The total revenue collected during the fiscal year on account of quarrying leases, including the application fees, amounts to $8,407.59.

WATER-RIGHTS.

There are now in force in the Yukon Territory 455 grants to divert water for mining purposes, aggregating a total of 109,646 miner's inches. During the last fiscal year nine water-rights were issued, comprising 1,310 miner's inches.

Grants are issued by this department, authorizing the diversion of water in the Yukon Territory for power purposes. Up to date, thirteen grants have been issued, authorizing the diversion of 131,200 miner's inches of water. Four of these grants have been permitted to lapse, but the remaining nine, authorizing the diversion of 66,200 miner's inches of water, are in good standing. Two power plants have been installed, one of which is situated on the north fork of the Klondike river, and it appears that this plant is kept in operation during the winter, and the power generated is being used for heating and lighting purposes in the city of Dawson.

COAL-MINING LANDS.

The total amount collected on account of the sale of coal-mining lands up to March 31, 1917, was $2,093,628.54.

The statement lettered "C," at the end of this report, shows the revenue derived from the sale of coal lands for each fiscal year since 1896.

COAL LEASES.

The total number of coal-mining leases in force at the close of the fiscal year was 540, including a total area of 270,762 acres, distributed as follows: In the province of Alberta, 462 leases, comprising 265,181 acres; in Saskatchewan, 77 leases, comprising 5,541 acres; and in Yukon Territory, one lease, comprising 40 acres.

The total number of leases of coal-mining rights issued during the year was 67, comprising 17,020 acres. The total revenue received during the year for rental of coal-mining rights was $168,420.34.

ROYALTY ON COAL.

Under the regulations governing the issue of leases to mine coal the royalty is fixed at five cents per ton of 2,000 pounds on the merchantable output of the mine.

The following is a statement showing the amount collected on account of royalty on coal mined from lands in the western provinces, the Northwest Territories, and the Yukon Territory, respectively, during each year since the regulations came into effect:—

Year.	Alberta.	Saskatchewan.	British Columbia.	Yukon.	Northwest Territories.
1903-4	$ 56 90	Nil.	Nil.	$ 2 40	Nil.
1904-5	2,822 00	$ 110 70	"	47 00	"
1905-6	2,379 75	47 10	"	569 33	"
1906-7	3,865 26	74 20	"	517 34	"
1907-8	7,621 67	4 30	"	1,543 38	"
1908-9	5,322 39	358 11	"	371 73	"
1909-10	153,559 98	1,672 50	$ 3 00	136 38	"
1910-11	218,932 88	2,184 74	3 50	125 00	"
1911-12	104,894 55	3,034 74	2 78	390 00	"
1912-13	142,997 79	3,145 72	6 95	1,069 11	"
1913-14	147,198 75	2,123 43	19 35	Nil.	"
1914-15	104,489 77	1,880 06	4 90	"	"
1915-16	67,190 17	2,601 52	3 50	"	$5 10
1916-17	149,447 82	2,228 08	8 92	"	Nil.

By an Order in Council dated April 7, 1913, provision was made that, owing to the scarcity of fuel in the Yukon Territory, no royalty shall be levied or collected on coal mined in that territory for a period of five years, that is, up to April 7, 1918.

The total amount derived from coal-mining lands on account of purchase price, rental, royalty and application fees, during the fiscal year, amounted to $324,899.93.

There are thirteen members of the staff of this branch on active service.

The following is a statement of the office work performed during the year:—

Letters received and recorded	18,416
" sent	68,780
Pages of memoranda and schedule	5,749
Reports on land from other branches	4,500
Plans and sketches prepared	1,364
Accounts kept posted	24,157
" rendered	13,468
Assignments accepted and registered	156
Returns examined and posted	2,029
Receipts issued	463
Refunds examined and prepared	102
New entries and renewals for mining locations granted in the Western Provinces and Territories, not including the Yukon	1,554
Applications for coal locations received	178
" stone, gypsum and clay received	40
" petroleum and natural gas received	772
" quartz claims in Alberta, Saskatchewan, Manitoba and the Northwest Territories	962
" placer mining claims in Alberta, Saskatchewan and Manitoba	7
" dredging leases	4
" homestead entries in the Yukon	6
" to purchase or lease lands in the Yukon	16
" for grazing leases in the Yukon	6
Homestead entries granted	6
Agricultural leases in force in the Yukon, comprising 187·85 acres	26
Water-front leases in existence	20
Gold dredging leases issued	4
Coal mining leases issued, comprising 17,020 acres	67
Quarrying leases issued, comprising 405 acres	18
Clay leases issued, comprising 20 acres	1
Petroleum and natural gas leases issued, comprising 183·871 acres	616
Grazing leases issued in the Yukon Territory	1
Prospecting reservations made under Section 18 of the Coal Mining Regulations, comprising 13·545 acres	16

H. H. ROWATT,
Comptroller.

REVENUE OF DOMINION LANDS

A.—STATEMENT of Receipts on account of Coal and Minerals in the Provinces and Mining Fees, Rental of Agricultural Lands, Water-power and Water Fronts, and

Month.	Quartz Acreage Sales.	Dominion Lands Sales.	Coal Sales.	Coal Mining.	Coal Royalty.	Coal Rental.	Rental, Yukon.	Timber Dues, Yukon.	Mining Fees.	Hydraulic Leases.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April		9 81	924 77	235 00	7,687 09	9,660 73	4,393 73	1,068 69	2,350 50	
May		265 09		385 00	15,295 74	19,080 93	1,393 36	2,494 15	2,768 00	
June		78 30		535 00	5,085 86	1,340 53	138 50	1,314 31	3,419 35	
July		5 00		380 00	10,122 27	11,950 76	13 79	1,986 24	5,330 35	73 50
August		137 54		50 00	17,097 38	3,703 27	75 63	993 22	8,705 25	507 00
September		143 87		135 00	11,847 57	7,239 34	235 10	1,033 75	11,795 50	
October	283 71	73 25		70 00	6,393 55	13,763 21	3 66	1,323 37	5,336 71	
November			65 00	235 00	15,125 23	22,309 28	90 00	1,020 75	2,323 00	375 00
December	88 37	145 36		275 00	11,060 48	12,147 32	336 69	1,050 75	8,887 70	1,383 00
January		16 50		180 00	23,005 75	15,087 72	1,146 98	373 00	2,909 75	
February		2 75	800 00	50 00	9,369 67	16,208 58	14 87	761 00	1,878 50	
March				475 00	19,594 23	35,928 67	67 60	1,141 25	2,989 00	
	372 08	877 47	1,789 77	3,005 00	151,684 82	168,420 34	7,909 91	14,560 48	58,693 61	2,338 50

SESSIONAL PAPER No. 25

INCLUDING THE YUKON TERRITORY.

Territories, also Timber, Hay, Coal, Hydraulic Mining, Dredging, Royalty on Gold, Sale of Dominion Lands in the Yukon, for the Fiscal Year ended March 31, 1917.

Dredging Leases, N.W.T.	Dredging Leases, Yukon.	Gold Export Tax.	Free Certificates Export of Gold.	Stone Quarry.	Map Sales Office and Registration Fees.	Homestead Fees.	Hay, Yukon.	Interim Receipt Account	Tar-Sands.	Sand, Stone and Gravel.	Petroleum and Natural Gas.	Confiscated Gold.	Total.
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
.....	.....	322 29	1 50	512 40	2 00	.....	.....	.....	27 00	....	918 26	....	28,113 77
40 00	200 00	4,912 18	2 50	642 92	10 00	10 00	49 00	26 75	.....	....	3,900 02	.....	51,475 64
.....	.....	14,359 70	3 00	1,154 34	.....	10 00	16 00	....	26 50	0 50	7,254 88	.....	34,736 77
.....	.....	13,349 46	3 00	662 44	.....	.....	18 50	....	.....	...	5,865 62	...	49,760 93
150 00	10 02	17,992 57	6 00	775 27	1 00	10 00	.....	.....	.....	0 50	9,782 05	.....	59,996 80
....	250 26	17,206 50	11 50	1,194 32	4 00	10 00	.....	22 50	500 00	...	7,639 12	.....	59,268 33
32 95	208 73	23,598 78	3 50	282 84	40 50	.....	.....	.....	.....	...	3,180 13	.....	54,594 89
.....	.....	4,938 10	1 00	507 42	7 00	10 00	.....	.....	55 73	0 60	10,655 52	35 15	57,753 78
.....	.....	729 27	2 50	704 51	10 00	.....	.....	.....	.....	50	3,829 08	.....	40,650 53
...	152 20	933 79	1 00	47 50	8 00	10 00	.....	.....	.....	...	4,524 86	.....	48,397 05
.....	.....	277 77	1 50	624 18	.....	.....	.....	143 25	1,000 00	...	21,113 69	.....	52,245 76
....	496 60	387 51	1 00	1,299 45	35 00	.....	.....	207 30	.....	0 50	13,310 70	.....	75,933 81
222 95	1,317 91	99,007 92	38 00	8,407 59	117 50	60 00	83 50	399 80	1,609 23	2 60	91,973 93	35 15	612,928 06

DOMINION LANDS REVENUE.

B.—STATEMENT showing the total amount of Revenue collected at each Agency, including the Yukon Territory, for the Fiscal Year ended March 31, 1917. (Revenue received at head office is in the statement credited to the several Agencies in which the lands are situated.)

Agency.	Quartz Acreage Sales.	Dominion Land Sales.	Coal Sales.	Coal Mining.	Coal Royalty.	Coal Rental.	Rental, Yukon.	Timber Dues, Yukon.	Mining Fees.	Hydraulic Leases.	Dredging Leases, N.W.T.	Dredging Leases, Yukon.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Battleford				10 00					2 50			
Calgary			865 00	1,945 00	27,946 59	39,432 42			631 21			
Dauphin									1,205 00			
Edmonton				250 00	29,199 89	76,882 61			617 00			
Estevan				20 00	422 93	429 60					190 00	
Grand Prairie					21 76	68 10						
High Prairie					1 90				5 00			
Kamloops												
Lethbridge			924 77	275 00	73,501 68	20,006 24						
Maple Creek				10 00	60 85	243 30						
Medicine Hat				30 00	196 65	1,039 62						
Moosejaw				130 00	305 20	631 69						
New Westminster					8 92							
Pas											32 95	
Peace River Crossing				60 00		145 80			387 50			
Prince Albert												
Red Deer				85 00	18,579 35	28,599 55			1,357 55			
Revelstoke									25 00			
Saskatoon												
Swift Current				5 00	33 95	41 27						
Unorganized						5 00			204 70			
Weyburn				185 00	1,405 15	855 14						
Winnipeg									6,585 15			
Dawson Gold Commissioner's Office									39,843 00	2,338 50		1,317 91
Duncan Mining Recorder's Office	283 71								3,648 50			
Sixty Mile Mining Recorder's Office									2,136 00			

Dawson Royalty Collector's Office												
Dawson Comptroller's Office												
Dawson Crown Timber Office								13,262 48				
Dawson Dominion Lands Office		723 30				40 00	5,098 83					
Dawson Mining Recorder's Office	88 37											
Whitehorse Asst. Gold Commissioner's Office									1,246 50			
Conrad Mining Recorder's Office									350 00			
Kluane Mining Recorder's Office									449 00			
Whitehorse Royalty Collector's Office												
Whitehorse Comptroller's Office												
Whitehorse Crown Timber Office								1,298 00				
Whitehorse Dominion Lands Office		154 17					2,811 08					
	372 08	877 47	1,789 77	3,005 00	151,684 82	168,420 34	7,909 91	14,560 48	58,693 61	2,338 50	222 95	1,317 91

DOMINION LANDS REVENUE.

B.—Statement showing the total amount of Revenue collected at each Agency, including the Yukon Territory, for the Fiscal Year ended March 31, 1917. (Revenue received at head office is in the statement credited to the several Agencies in which the lands are situated.)—*Concluded.*

Agency.	Gold Export Tax.	Free Certificate Export of Gold.	Stone Quarry.	Map Sales, Office and Registration Fees.	Homestead Fees.	Hay, Yukon.	Interim Receipt Account	Tar-Sands.	Sandstone and Gravel.	Petroleum and Natural Gas.	Constituted Gold.	Total.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts	$ cts.	$ cts.
Battleford			22 28									34 78
Calgary			740 81	8 50					1 00	2,018 42		73,588 95
Dauphin			35 80									1,240 80
Edmonton			1,573 36				194 80	1,609 23	1 10	36,665 78		147,183 74
Estevan												872 53
Grand Prairie			34 05									128 91
High Prairie			188 95									190 85
Kamloops			404 48						0 50			404 98
Lethbridge			334 26	8 00						20,412 56		115,462 51
Maple Creek			195 00							25 00		534 15
Medicine Hat			215 80							2,266 69		3,748 76
Moosejaw			697 43									1,764 32
New Westminster			591 24							11,453 55		12,086 66
Pas												387 50
Peace River Crossing			72 50							12,448 11		12,726 41
Prince Albert			3 00				15 00					1,375 55
Red Deer			120 00	2 00								47,410 90
Revelstoke			80 00									80 00
Saskatoon			118 73							6,311 45		6,430 18
Swift Current			240 00	2 00						10 00		332 22
Unorganized				35 00								244 70
Weyburn			45 00									2,490 29
Winnipeg			2,694 90							362 40		9,642 45
Dawson Gold Commissioner's Office							190 00					43,689 41
Duncan Mining Recorder's Office				40 00								3,972 21
Sixty Mile Mining Recorder's Office												2,136 00

Dawson Royalty Collector's Office	98,555 45											98,555 45
Dawson Comptroller's Office		33 00										33 00
Dawson Crown Timber Office												13,262 48
Dawson Dominion Lands Office				22 00	50 00	83 50					35 15	6,052 78
Dawson Mining Recorder's Office												88 37
Whitehorse Asst. Gold Commissioner's Office												1,246 50
Conrad Mining Recorder's Office												350 00
Kluane Mining Recorder's Office												449 00
Whitehorse Royalty Collector's Office	452 47											452 47
Whitehorse Comptroller's Office		5 00										5 60
Whitehorse Crown Timber Office												1,298 00
Whitehorse Dominion Lands Office					10 00							2,975 25
	99,007 92	38 00	8,407 59	117,50	60 00	83 50	399 80	1,609 23	2 60	91,973 93	35 15	612,928 06

C.—STATEMENT showing the total Revenue derived from the Sale of Coal Lands for each Fiscal Year since 1896.

1896-1897	$ 75 76
1897-1898	1,883 74
1898-1899	350 00
1899-1900	5,650 33
1900-1901	101,772 00
1901-1902	16,270 32
1902-1903	31,055 38
1903-1904	68,949 75
1904-1905	35,695 00
1905-1906	125,754 12
For the nine months ending March 31, 1907	335,795 97
1907-1908	346,813 23
1908-1909	276,186 86
1909-1910	377,445 86
1910-1911	191,257 23
1911-1912	11,861 66
1912-1913	1,889 52
1913-1914	5,529 55
1914-1915	326 29
1915-1916	165 03
1916-1917	1,789 77
Total	$1,936,517 37

D.—STATEMENT showing the total Gold Production, the total subject to Royalty, and the total Royalty collected for each Fiscal Year from May 1, 1898, to March 31, 1917.

Fiscal Year.	Gold Production.	Subject to Royalty.	Royalty Collected.	Total Revenue.
	$ cts.	$ cts.	$ cts.	$ cts.
1897-1898	3,072,773 20	2,732,928 20	273,292 82	273,292 82
1898-1899	7,582,283 02	5,882,626 00	588,262 37	589,943 52
1899-1900	9,809,464 64	7,307,720 00	730,771 99	733,041 04
1900-1901	9,162,082 79	7,234,416 17	592,660 98	596,368 03
1901-1902	9,566,340 52	8,367,225 88	331,436 79	331,532 04
1902-1903	12,113,015 34	12,113,015 31	302,893 48	302,893 48
1903-1904	10,790,663 12	10,790,663 12	272,217 96	272,217 96
1904.1905	8,222,053 91	8,222,053 91	206,760 87	206,760 87
1905-1906	6,540,007 09	6,540,007 09	163,963 25	163,963 25
1906-1907	3,304,791 05	3,304,791 05	82,622 42	82,622 42
1907-1908	2,820,161 60	2,820,161 60	70,504 65	70,504 65
1908-1909	3,260,282 80	3,260,282 80	81,507 07	81,507 07
1909-1910	3,594,251 20	3,594,251 20	89,844 10	89,844 10
1910-1911	4,126,727 60	4,126,727 60	103,168 19	103,168 19
1911-1912	4,024,236 75	4,024,236 75	100,606 29	100,606 29
1912 1913	5,018,411 85	5,018,411 85	125,460 52	125,460 52
1913-1914	5,301,507 60	5,301,507 60	132,537 69	132,537 69
1914-1915	4,649,634 40	4,649,634 40	116,241 04	116,241 04
1915.1916	4,458,278 00	4,458,278 00	111,457 19	111,457 19
1916-1917	3,960,206 99	3,960,206 99	99,007 92	99,007 92
Total	121,377,173 47	113,709,145 55	4,575,217 59	4,582,970 09

SESSIONAL PAPER No. 25

SUMMARY OF WORK PERFORMED IN THE INSPECTING AND ENGINEERING DIVISION OF THE M. L. & Y. BRANCH— SEASON 1916-1917.

The duties of the inspecting engineer are as follows: The inspecting and surveying of coal mines on Dominion and school lands, the output of which is subject to the payment of royalty; to keep an accurate record of the underground workings of all such mines; to ascertain, by computation from survey, whether the operators have paid the proper amount of royalty; to ascertain whether the operators are confining their underground operations to the limits of their own lands, and, generally, to inspect and report on any mining matters under investigation by either the Mining Lands and Yukon Branch or by the School Lands Branch.

In order to carry out this work, I have one assistant, who accompanies me in the field; a draftsman, who is employed in the office at Ottawa; and a mining inspector, whose headquarters are at Calgary.

The following is a summary of the work performed during the year in question:—

Number of mines inspected	245
" complete surveys of new mines	9
" extensions of former surveys in old mines	38
" reports made and submitted	350
" plans compiled from field notes	49
" declarations *re* output, approximately	150

Numbers of cases were discovered where operators were furnishing incorrect returns. Those mining with proper authority, but making incorrect returns, were charged with what should have been paid originally. Those mining without authority were charged double dues.

During the winter of 1916-17, the field-notes were extended; plans drawn, computations of output made, and the maps and reports, referred to above, submitted.

In addition to this, we have compiled a large map of the province of Alberta, showing the coal lands disposed of by lease and sale, and showing also school lands, Hudson's Bay lands, railway lands, parks and forest reservations. This will be a useful map to coal operators in the West, and to the public generally. There is no doubt that the demand for it will be great, and it is hoped it will be published and ready for distribution at an early date.

O. S. FINNIE,
Inspecting Engineer.

ANNUAL REPORT OF ADMINSTRATOR OF THE YUKON TERRITORY FOR THE FISCAL YEAR ENDING MARCH 31, 1917.

GOLD PRODUCTION.

The amount of gold mined on which royalty was paid was 264,020.47 ounces, value being $3,960,306.95, at $15 per ounce. The royalty paid on the output amounted to $99,007.92. There was a decrease of $497,971.05 from the total output for the year ending March 31, 1916. This is mainly due to the fact that one of the Yukon Gold Company's largest dredges, which had been operating on Eldorado, one of the best gold-producing creeks in the district, reached the limits of the company's holdings on this creek in the fall of 1915, and was not operated during the season of 1916.

The gold produced was chiefly from the dredging and hydraulic operations carried on by the various dredging and hydraulic mining companies in the territory.

The Walker's Fork Gold Dredging Company terminated its operations on the Miller Creek concession in September, 1916, having worked out all the dredgeable

ground contained in the concession. The dredge and other equipment of the company is now being moved and reassembled on the Upper Sixtymile river, where there seems to be sufficient scope for extensive operations.

A new mining company has entered the field in the Upper Stewart River district, and is now engaged in constructing a dredge to be operated on Highet creek.

There are also a large number of individual miners operating and prospecting on the many gold bearing creeks throughout the territory.

A more detailed amount of the operations of the large companies, as well as the individual or smaller concerns may be seen in the report of the Gold Commissioner.

QUARTZ MINING.

The Silver King Mining property, situate in the Upper Stewart River district, from which a large quantity of silver ore, averaging over $250 per ton, was taken during the winter of 1915-16, has since been disposed of by the former owner, and the new owners of the property have intimated their intention of doing a large amount of development work on this property, during the present season.

At its last session the Yukon council voted an appropriation for the purchase of a diamond drill. This drill will be used for prospecting the many promising lode properties now being held in the Stewart river and Whitehorse districts. It is to be regretted, however, that owing to a very serious accident, which occurred to the underground workings in the Pueblo copper mine, it is now shut down indefinitely. This mine has been much the largest shipper of ore from the territory while in operation for the past several years. However, it is hoped that this property will soon again be put into good condition and placed on the ore-shipping list.

PUBLIC WORKS.

The appropriation provided by the Yukon council for the proper care and maintenance of the road system of the territory and the construction of new roads, where it was found necessary, were properly administered; a large amount of repair work was done and a considerable mileage of new roads was constructed.

PUBLIC BUILDINGS.

The necessary repairs and improvements were made to all government buildings in the territory; a large addition was built on to the Whitehorse public school for the accommodation of a high-school class, which was inaugurated at the beginning of the present school year.

The public schools of the territory have been kept at their usual high standard of efficiency. The average attendance at both the Dawson and Whitehorse public schools for the past several years was fully maintained. Assisted schools are provided wherever it is found necessary throughout the territory.

ADMINISTRATION OF JUSTICE.

The territory has been remarkably free from crime. The numerical strength of the Royal Northwest Mounted Police has been sufficient for the proper policing of the territory.

I transmit herewith the reports of the Gold Commissioner, the Crown Timber and Land Agent, and the Comptroller.

G. N. WILLIAMS,
Administrator.

SESSIONAL PAPER No. 25

Annual report of the Comptroller's office for the fiscal year ending March 31, 1917:—

Under the appropriation through the Department of the Interior, "Administration of the Yukon Territory," the expenditure amounted to $118,566.54, as shown by the monthly statements and vouchers forwarded to the department. This is a decrease in expenditure of $11,399.33 from fiscal year ending March 31, 1916.

The expenditure on account of the Department of Justice was $14,143.19, as per monthly returns made to that department. This represents a decrease of $3,267.37 from previous year's expenditure.

Under the letter-of-credit account, Department of Public Works, for maintenance and repairs of public buildings in the Yukon territory, the expenditure was $46,093.91, being $12,643.73 less than year ending March 31, 1916. For river improvement work the expenditure amounted to $3,394.82.

The expenditure on account of the Department of Indian Affairs for the relief of sick and destitute Indians in the Yukon territory was $13,482.37, being an increase of $2,975.91 over previous year.

The royalty export tax collected in the territory for the year ended March 31 amounts to $99,007.92; collected at Dawson, $98,555.45; Whitehorse, $452.47; at Forty-mile, nil.

The revenue from free certificates issued to exporters of gold from Alaska was $37.50; collected at Dawson, $33, and Whitehorse, $4.50.

The revenue collected in the Gold Commissioner's office, on account of mining dues, amounted to $48,854.11; and in the Crown Timber and Land Agent's office, on account of crown timber, $13,345.98, and Dominion lands, $5,597.51. The revenue from these various sources was deposited in the Dominion Revenue Trust account, in the Canadian Bank of Commerce, daily, as received, and drafts purchased weekly in favour of the Receiver General and forwarded to the department. Weekly statements of these various sources of revenue, with counterfoils, were checked in this office and transmitted to the department, and monthly summaries were also checked and transmitted.

The revenue in the registrar's office on account of land titles fees, for the year ending March 31, amounted to $796.85, which was deposited daily in the Dominion Revenue Trust account, as received, and drafts purchased weekly in favour of the Receiver General and forwarded to the department. Monthly statements in duplicate were also checked in this office and forwarded to the department.

The revenue from the sale of Yukon Territorial court law stamps amounted to $2,268.25.

G. A. JECKELS,
Comptroller.

Annual report of Gold Commissioner of the Yukon territory for the fiscal year ending March 31, 1917, accompanied by the following statements:—

1. A financial statement showing the receipts in the Gold Commissioner's office during the said year, and also receipts in the offices of the mining recorders for the Duncan and Sixtymile district.

2. A financial statement of the receipts in the Gold Commissioner's office for the fiscal year, being a recapitulation.

3. A comparative statement of the receipts for the fiscal years ending March 31, 1916, and March 31, 1917.

The comparative statement referred to shows a decrease in revenue of $7,186.78, compared with that for the previous year. This decrease is accounted for in the main by conditions brought about by the war. One hundred and eighty-two placer claims and forty-three mineral claims are being held free from cancellation, owing to the owners' absence at the front. This entails a very considerable loss of revenue, and the enlisting of so many prospectors and miners has reduced the number of new locations, with a consequent loss of revenue from this source.

THE YUKON GOLD COMPANY.

Dredging Operations.—The Yukon Gold Company operated seven dredges during the year and utilized their various hydraulic plants to capacity. Dredge *No. 3*, referred to in my report of last year as being reassembled at Bear creek, was not ready for operating until near the end of the season. The other dredges operated for 162 days. Particulars as follows:—

No.	Make.	Capacity of Buckets.	Location.
1	Bucyrus	5 cubic feet	97A to 102 below on bonanza.
2	"	5 "	41 to 37 below on bonanza.
3	"	5 "	18 to 16 below on Bear Bonanza.
4	Marion	7 "	46 to 50 below on Hunker.
5	Bucyrus	7 "	Disc. Bonanza to 1 Eldorado.
6	"	7 "	11 to 9 on Gold Run Creek.
8	"	7 "	30 to 38 above on bonanza.

The company's hydro-electric plant on the Twelve Mile river furnished ample power to operate the equipment of the company.

The average number of men employed operating these dredges and the steam thawing plants used in connection therewith was 281, and a total yardage of 5,400,000 cubic yards of material was dredged.

Hydraulic Operations.—Hydraulic operations were carried on at nine different points on the company's property, as follows:—

Adams Hill,
Bunker Hill,
Monte Cristo Gulch,
American Gulch,
Lovett Gulch,
American Hill,
Fox Gulch,
Magnet Gulch.

An average of 72 men were employed, and 2,200,000 cubic yards of material removed.

Miscellaneous.—In addition to the men directly employed in the dredging and hydraulic operations, a considerable force was employed in prospecting, in ditch maintenance, and in their power plant and machine shops.

The average number of men employed by this company during the open season was as follows:—

Hydraulic mines (April to October)	72
Dredges and thawing (April to October)	281
Ditch (April to October)	37
Otherwise employed (April to October)	87
Total	477

THE CANADIAN KLONDIKE MINING COMPANY, LIMITED.

Dredging Operations.—This company operated their four dredges during the season, and up to January 1, 1917, had dredged 5,950,400 cubic yards of material. Particulars regarding these operations are as follows:—

No.	Capacity of Buckets.	Location.
Canadian No. 1.	7½ cubic feet.	Upper Hunker Creek.
" No. 2.	17 "	In the Klondike Valley on Hydraulic Mining Lease 18.
" No. 3.	17 "	In the Klondike Valley on Hydraulic Mining Lease 18.
" No. 4.	17 "	In the Klondike Valley on Hydraulic Mining Lease 18.

Canadian	No. 1	operated	236 days.
"	No. 2	"	318 "
"	No. 3	"	168 "
"	No. 4	"	197 "

In my report of last year reference was made to the fact that dredge *Canadian No. 4* was operated until January 25, breaking all previous records for winter dredging in the Yukon. This year this company has kept at least one dredge in operation throughout the entire winter. Dredge *Canadian No. 2* operated continuously until March 26, on which date the dredge was closed down to enable the necessary yearly repairs to be made. Simultaneous with the closing down of this dredge, *Canadian No. 4*, having been refitted, resumed operations. This accomplishment is all the more remarkable when the fact is taken into consideration that the past winter was one of exceptional severity.

All of the dredges operated by this company are electrically driven, the power being furnished by the Canadian Klondike Power Company's hydro-electric plant at the north fork of the Klondike river. This plant, which is under the same management as the Canadian Klondike Mining Company, Limited, was in continuous operation throughout the winter.

A large reservoir is being constructed at a point about three miles above the intake of the present ditch on the north fork. This reservoir is for the purpose of conserving the surplus waters of the north fork, so that the same can be utilized when the water supply is low in that stream. The reservoir when completed will have a capacity sufficient to operate the entire hydro-electric plant for a period of sixty days. $125,000 was spent on these betterments during 1916, and an expenditure of a like sum will be required to complete the undertaking.

Hydraulic Operations.—The pumping plant installed last year near the mouth of Hunker creek was operated throughout the season, 163,060 cubic yards of gravel having been handled. The supply of water for these pumping operations is obtained from the Klondike river, being conducted to the pumping plant through four miles of ditch. The discharge of the pump is into a ditch on the left limit of Hunker creek, which ditch in turn conveys the water to the point of hydraulic operations on Last Chance creek, about four miles distant. The pumping equipment consists of a 4-stage Kingsford centrifugal pump, direct connected to a 1,200 horse-power rotor-wound motor pumping against a 600-foot hydraulic head.

Miscellaneous.—In addition to the men directly employed in the dredging and hydraulic operations, a considerable force was employed in ditch maintenance, prospecting, wood-cutting and hauling, and in the machine shop. An average of 300 men was employed by this company during the open season.

NORTHWEST CORPORATION, LIMITED.

This corporation, through its holding companies, the Dominion Mining Company, the Big Creek Mining Company, and the Calder Mining Company, controls the greater portion of the Dominion, Sulphur, and Quartz creeks.

No gold was recovered during the year, the operations being confined entirely to ground sluicing. The Dominion Mining Company operated on Upper Dominion, removing 121,413 cubic yards; the Big Creek Mining Company operated on Lower Dominion, removing 267,351 cubic yards; and the Calder Mining Company on Quartz creek, removing 267,351 cubic yards.

As stated in my report of last year, it is unlikely that extensive operations will be carried on by this corporation until the war is ended.

NISLING MINING DEVELOPMENT AND MERCANTILE COMPANY.

This company has acquired by purchase seventy placer claims on Upper Nansen creek and tributaries. During the past year they have incurred a heavy expenditure in transporting hydraulic pipe and other hydraulic equipment to the property, and during the coming season anticipate completing their system of ditches and the installation of their hydraulic equipment.

INDIVIDUAL OPERATIONS.

Although the greater portion of the creeks and tributaries of the Klondike and Indian rivers are now controlled by the companies referred to, considerable individual mining is still carried on on these creeks.

During the past year Sulphur creek had nineteen steam thawing and hoisting plants in operation; Hunker and tributaries, ten such plants; and five outfits operated by open-cut method, and nine outfits carried on hydraulic operations.

Dominion creek had five individual outfits working; Quartz creek and tributaries, fifteen; Black Hills, eight; Scroggie and tributaries, fifteen; Barker creek, three; Thistle creek, seven; Kirkman creek, eleven; All Gold, three; Gold Run Creek, two; Bonanza creek and tributaries, twenty-five; Rude creek, eight; Henderson creek, eight; Clear creek, five; and Ten Mile, seven.

In addition to these actual mining operations, considerable prospecting was being carried on on the creeks referred to and on other outlying creeks of the district.

LODE MINING, DAWSON DISTRICT.

Of the large number of mineral claims in good standing in this district, only on a very few is any work being done, except the necessary representation work to keep the properties in good standing.

Mr. James Lloyd continued his tunnel on the "Red Hill" mineral claim, situated on Gold Run creek, to a length of 170 feet, and reports himself well satisfied with his prospects.

The Bear Creek Mining Company, during the past summer, had a mill shipped to Dawson, with the intention of installing the same on their property at Bear Creek, but owing to some hitch in the financial arrangements, have not yet had the mill set up on the property.

Dr. J. O. Lachapelle and associates have done considerable development on their copper properties on Williams creek, and have now, on the bank of the Yukon, a few tons of ore for shipment on the opening of navigation.

PLACER MINING, DUNCAN DISTRICT.

Placer mining operations in this district were on about the same scale as in 1916. Dublin, Haggart, Highet, and Duncan creeks continued to be operated profitably. Further development on Gull creek, in the Mayo Lake section of this district, has brought this creek into the producing class.

The Klasco Dredging Company, an American company, incorporated under the laws of the state of Washington, has secured a working option on the greater portion of Highet creek, and proposes installing a dredge there during 1917. The machinery for this dredge was landed at Mayo before the close of navigation last year, was freighted to Highet creek during the past winter, and the dredge is expected to be in operation during the coming summer. If this dredge is a success, it will probably mean the installation of other dredges in this district.

The Dublin Creek concession, which was thrown open for placer entry on the 5th February last, was practically all located. A discovery of scheelite on this creek has stimulated activity in prospecting.

LODE MINING, DUNCAN DISTRICT.

Considerable development work was performed during the year on the different mineral claims in this district, particularly on the Stewart and Catto group of claims on Dublin gulch, and on the Silver Lead properties on Galena creek.

One thousand one hundred and fifty-four tons of very rich ore was mined and shipped from the "Silver King" mineral claim during the past year, and although no work was performed on this property during the past winter, the owners state that they will continue operations during the present summer.

PLACER MINING, SIXTYMILE DISTRICT.

This district continues to be a steady producer; 170 placer claims are in good standing and about 100 men were engaged during the year in individual mining operations in the district.

The Milvain dredge, which for several years has been operating on Miller Creek concession, completed the work on that leasehold, and is now being reassembled on placer claims owned by the North American Transportation and Trading Company, situated on the Sixtymile, between the mouths of Big Gold and Miller creeks.

G. P. MACKENZIE,
Gold Commissioner.

Report of Crown Timber and Land Agent for the Dawson district, for the fiscal year ending March 31, 1917, accompanied by the following statements:—

1. Statement showing the revenue collected in the timber branch of this office from royalty on wood and timber cut on timber berths, dues paid in connection with timber and wood permits, seizure dues on wood and timber cut in trespass, and hay permits.

2. Statement of revenue collected in the Dominion Lands branch of this office, on land rentals, land sales, office fees, rental coal lands and homestead entries.

These statements show a net increase in revenue of $477.16 in the Crown Lands branch, and a net increase of $4,118.76 in the Crown Timber branch, compared with the revenue as shown by the statement for the fiscal year ending March 31, 1916. The increase of revenue in the timber branch is accounted for chiefly in the amount of wood cut for the Dawson market. Owing to transportation difficulties, the supply of coal brought to Dawson was not sufficient to supply the market, and as a consequence more wood was used for fuel purposes.

WOOD AND TIMBER.

One hundred and fifty-eight permits were issued during the year, under the authority of which 398,502 feet board measure lumber, 20,201½ cords of wood, and 2,550 lineal feet telephone poles were cut. 1,969½ cords of wood and 79,408 feet board measure lumber were cut under license and sold. Seizure dues were paid on 728½ cords of wood.

Four saw-imills operated in the district during the year. The Yukon Saw Mill Company operated their mill at Dawson, manufacturing all the native lumber required to supply the Dawson market and nearby creeks. This company has on hand a well-assorted stock of both native and British Columbia lumber. The mill owned by the Canadian Klondike Mining Company, Limited, situated on the north fork of the Klondike river, manufactured all the lumber required by that company in their extensive mining operations. The mills owned and operated by Messrs. C. L. Snell and J. B. Lefebvre, at Mayo, manufactured sufficient lumber to supply the requirements of the Upper Stewart district.

Frequent inspections of the various wood and timber camps were made throughout the year. No forest fires of any magnitude occurred during the year.

COAL.

The Five Fingers Coal Company operated their mine at Tantalus during the summer, and shipped to Dawson all the coal the Transportation Company would handle. Owing to a strike of the Transportation Company's dock employees they were unable to furnish transportation to the coal company, as a consequence of which many of the patrons of the coal company in Dawson, being unable to secure coal, were forced to substitute wood in their various heating plants.

No coal was mined on the property of the Northern Light Power and Coal Company, Limited, at Coal Creek.

AGRICULTURE.

Five homestead entries were granted during the year and a larger acreage was under cultivation than in any previous year. The crops were excellent both in quantity and quality. The growth of the various grains, which were cut mostly for fodder, was very heavy.

The potato crop was good and each year the quality of the potatoes appears to improve. About 85 per cent of the potatoes used in the territory are grown locally, and practically all the other vegetables used.

Interesting experiments in growing different grains are being carried on by the farmers in the vicinity of Dawson. On the farm of James R. Farr, at the mouth of Swede creek, wheat sown on the 22nd April and harvested on the 17th August was fully matured, was of excellent quality, and gave a phenomenal yield.

G. P. MACKENZIE,
Crown Timber and Land Agent.

CROWN LAND BRANCH.

—	Land Rentals.	Land Sales.	Office fees.	Rental Coal Lands.	Homesteads	Total.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April 1916	2,037 73	9 81				2,047 54
May "	1,049 61	203 45	0 10		0 10	1,273 06
June "	137 50	79 30				216 80
July "	13 79	5 00				18 79
August "	18 90	127 07			0 10	155 97
September "	235 10	85 67			0 10	330 77
October "	3 66	73 25				76 91
November "	90 00		0 02		0 10	102 00
December "	11 07	138 00		0 40		189 07
January 1917	1,146 98				0 10	1,156 98
February "	14 87	2 75				17 62
March "	12 00					12 00
Total	4,771 21	724 30	0 12	0 40	0 50	5,597 51

Total Receipts 1915-1916 ..... $ 5,120 35
Total Receipts 1916-1917 ..... $ 5,597 51

Net Increase 1916-1917 ..... $ 477 16

CROWN TIMBER BRANCH.

—	Royalty.	Timber Permits.	Seizure Dues.	Hay permits	Total.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April 1916	200 00	805 69	63 00		1,068 69
May 1916	788 85	1,355 30	145 00	49 00	2,338 15
June 1916	158 81	1,102 75	47 75	16 00	1,325 31
July 1916	8 25	1,963 49	14 50	18 50	2,004 74
August 1916		983 22	10 00		993 22
September 1916	69 50	906 75	57 50		1,033 75
October 1916		1,242 37	76 00		1,318 37
November 1916	39 00	516 25	145 25		700 50
December 1916		571 25	19 50		590 75
January 1917		330 00	20 00		350 00
February 1917		740 00	16 00		756 00
March 1917		836 50	30 00		866 50
Total	1,264 41	11,353 57	644 50	83 50	13,345 98

Total Receipts 1915-1916 ..... $ 9,227 22
Total Receipts 1916-1917 ..... $ 13,345 98

Net Increase 1916-1917 ..... $ 4,118 76

FINANCIAL STATEMENT Gold Commissioner's Office, year ending March 31, 1917.

RECAPITULATION.

	Placer Grant.	Renewal Grant.	Reloc, Grant.	Reg. Doc. Placer.	Abstract Placer.	Water Right.	Hydraulics.	Dredging.
	$ cts.	$ cts.	$ cts.		$ cts.		$ cts.	$ cts.
Dawson	600 00	33,325 00	1,310 00	2,697	13 50	270	1,963 50	866 03
Duncan	560 00	1,710 00	340 00	127				
Sixty-mile	70 00	1,550 00	400 00	116				
	1,230 00	36,585 00	2,050 00	2,940	13 50	270	1,963 50	866 03

	Quartz. Record.	Cert. of Work.	Cert. of Part.	Cert. of Impr.	Reg. Doc. Quartz.	Lieu of Asst.	Acr. and Crown Grant.	Abst. Qtz.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts,
Dawson	270 00	920 00	17 50	0 05	190 00	200 00	98 37	
Duncan	345 00	307 50	17 50	0 20	195 00		323 71	26 50
Sitxy-mile								
	615 00	1,227 50	35 00	0 25	385 00	200 00	422 08	26 50

FINANCIAL STATEMENT of the Gold Commissioner's Office, from April 1, 1916, to March 31, 1917, Dawson, Y.T.

RECEIPTS.

Placer—		
To Grants	$ 600 00	
Renewals	33,325 00	
Relocations	1,310 00	
Registered documents	2,697 00	
Abstracts	13 50	
		$37,945 50
Quartz—		
To Grants	$270 00	
Certificates of work	920 00	
Certificate of partnership	17 50	
" improvements	5 00	
Registered documents	190 00	
Lieu of assessment	200 00	
Acreage and Crown grants	98 37	
		1,700 87
Sundry Accounts—		
To Water rights	$ 270 00	
Hydraulics	1,963 50	
Dredging	866 03	
		3,099 53
Duncan—		
To Placer grants	$ 560 00	
" renewals	1,710 00	
" relocations	340 00	
" registered documents	127 00	
Quartz records	345 00	
" certificate of work	307 50	
" certificate of partnership	17 50	
" " improvements	20 00	
" registered documents	195 00	
" abstracts	26 50	
" acreage and Crown grants	323 71	
		3,972 21

FINANCIAL STATEMENT of Gold Commissioner's Office, etc.—*Concluded.*

RECEIPTS—*Concluded.*

Sixtymile—		
To Placer grants	$ 70 00	
" renewals	1,550 00	
" relocations	400 00	
" registered documents	116 00	
		$ 2,136 00
		$48,854 11

DISBURSEMENTS.

To Comptroller	$48,854 11	
	$48,854 11	$48,854 11

COMPARATIVE STATEMENT—Returns, Gold Commissioner's Office, Dawson, Y.T.

—	Year ending March 31, 1916.	Year ending March 31, 1917.	Increase, 1917.	Decrease, 1917.
	$ cts.	$ cts.	$ cts.	$ cts.
Placer grants	5,900 00	1,230 00		4,670 00
Placer renewals	39,870 00	36,585 00		3,285 00
Placer relocations	1,830 00	2,050 00	220 00	
Placer registered documents	1,851 00	2,940 00	1,089 00	
Placer abstracts	84 50	13 50		71 00
Water rights	175 00	270 00	95 00	
Hydraulics	2,495 77	1,963 50		532 27
Dredging	518 76	866 03	347 27	
Quartz grants	830 00	615 00		215 00
Quartz registered documents	264 00	385 00	121 00	
Quartz certificate of works	1,342 50	1,227 50		115 00
Quartz certificate of partnership	52 50	35 00		17 50
Quartz certificate of improvements	20 00	25 00	5 00	
Quartz lieu of assessment	100 00	200 00	100 00	
Quartz acreage and crown grants	701 86	422 08		279 78
Quartz abstracts	5 00	26 50	21 50	
	56,040 89	48,854 11	1,998 77	9,185 55
Net decrease				7,186 78

REPORT OF THE WHITEHORSE DOMINION LANDS AND MINING DISTRICT.

This is intended to cover all the operations dealt with by this office in connection with mining, Dominion lands and Crown timber, and also the operations of the Kluane and Conrad mining offices, up to the first day of January last. Both these offices were closed at that time, and their records turned over to the Whitehorse office, where their work will be carried forward henceforth. I have little doubt that this can be done with much less inconvenience to the miners of Kluane and Conrad than might have been expected. Two most suitable agents have been appointed, Mr. A. D. MacLennan, the former recorder, for Kluane, and Mr. Matthew Watson, for Conrad, and I feel assured that with their assistance the task of carrying forward the work of their former districts will be continued with a minimum of dissatisfaction.

LODE MINING.

The year started out with most bright prospects in regard to the development of this the most important part of the Whitehorse district. Six of the most important of the copper properties in the Whitehorse copper belt were either in full operation or making preparations to that end. These were the "Pueblo," "Grafter," "War Eagle," "Copper King," "Anaconda, No. 2," and "Carlisle." All of these were operated pretty steadily throughout the year, and large and valuable shipments of ore made. Unfortunately a most serious accident to the largest of these, the "Pueblo," occurred on March 21 last, when a slide occurred, involving practically the whole workings between the 200- and the 400-foot levels, with the exception of the main shaft. Nine men were engulfed by this slide, but after most heroic efforts on the part of their fellows, three of these were rescued, but the case of the others was hopeless and all efforts to reach them had to be abandoned, as at this time it was found that the main shaft was becoming unsafe. Accordingly, all the men were called out and the mine shut down. The machinery and tools, including the Government diamond drill, were thus lost. Mr. Greenough, the manager, estimates this loss at close to $40,000. The mine is now fully flooded and there is no hope that it can again be operated unless a new shaft be sunk.

The quantity of copper ore shipped during the year was in excess of 61,000 tons, and the smelter returns from this, after deducting freight charges and smelter treatment, are approximately $668,000. The details as to this are as follows:—

"Pueblo," 51,554 tons; net value as above	$515,540 00
"Grafter," 6,500 tons; net value as above	80,000 00
"War Eagle," 1,931 tons; net value as above	38,926 00
"Copper King," 741 tons; net value as above	23,419 00
"Anaconda," 360 tons; net value as above	10,000 00

In addition to this fully 500 tons of ore have been mined on the "Venus" property, and a few tons on a couple of adjoining gold, silver and lead properties, situated on Windy arm of lake Tagish. The average net return from this, as shown by a return from 150 tons shipped, appears to be about $42 per ton. This "Venus" property is being operated by the Lakinaw and Tagish mines, whose head office is in Seattle, Washington. There is a concentrating mill attached to this property. It was installed by Col. J. H. Conrad some years since, but was found unsuitable in many respects at that time; too large a percentage of the values in the ore were lost in treatment. This mill is now being remodelled in line with more recent knowledge, and it is hoped will prove all the success that may be desired.

The placer situation of the district has remained pretty much as before, and the production has, if anything, somewhat declined. It was hoped a year ago that Livingstone creek would have developed new sources of value, but thus far such has not proved to be the case. However, the miners have absolute faith in their camp and feel assured that its output will materially increase at an early day; and the same may be said of Kluane. Both these camps are sadly hampered by lack of capital and to a certain extent, too, by labour shortage, which is aggravated by the fact that not a few of the younger men have volunteered for the European war.

There has been nothing unusual in the timber and land situation during the year. Seven permits to cut cordwood and one for sawn timber were issued, and dues collected on 3,226 cords of wood.

The fox farms are maintained about as last year, but I believe the prospects have brightened a good deal this spring. It is difficult to get details as to increases; many of the owners are not aware as to these themselves. But the general opinion appears to be that, both in numbers and quality, the additions to the stock have been highly encouraging.

R. C. MILLER,
Assistant Gold Commissioner.

SESSIONAL PAPER No. 25

REPORT OF THE TIMBER AND GRAZING LANDS BRANCH.

The following is a report for the fiscal year ending March 31, 1917:—

The revenue derived from timber, grazing and hay lands for the year amounted to $534,381.75, which is an increase of $40,410.63 over the preceding year.

At the conclusion of this report will be found statement A, which sets out the total revenue of the branch from its various sources for the year; statement B, showing the revenue from timber by agencies; statement C, other sources of revenue by agencies; and statement D, the office work performed.

Statements from the Crown Timber agents at Calgary, Edmonton, Prince Albert, Winnipeg, Kamloops, Revelstoke and New Westminster, showing the revenue collected on Dominion lands within their respective agencies and other information, are appended hereto.

The report of the Inspector of Crown Timber agencies, whose headquarters are at Winnipeg, and the reports of the inspectors of branches located at Calgary, Maple Creek, Moosejaw, Minnedosa and Prince Albert, are also attached.

The revenue derived from timber and grazing lands, received at the Crown Timber agencies above mentioned, also the number of mills operated on timber berths held under license, and the number of portable saw-mills in operation, may be summarized as follows:—

Agency.	Total Revenue.	No. of mills operating under license.	No. of mills operating under permit.
	$ cts.		
Calgary	35,253 85	15	16
Edmonton	93,311 74	39	75
Prince Albert	67,816 99	23	35
Winnipeg	64,469 60	24	32
Kamloops	20,883 51	4	
New Westminster	92,768 25	25	
Revelstoke	31,576 07	4	

The returns of operations received show the following quantities of building timber to have been manufactured and sold under government license during the year in the timber agencies above mentioned:—

——	Manufactured.	Sold.
Sawn lumber, feet B.M	277,189,607	250,460,536
Shingle bolts	39,711	39,999
Railway ties	133,030	243,708
Laths	46,653,764	42,435,884
Lineal feet piling	38,940	47,160
Telegraph poles	2,365	2,365
Cordwood	5,331	3,218
Fence posts	783,552	

The following material was manufactured on permit berths and portable saw-mill berths, and sold:—

	Manufactured.	Sold.
Sawn lumber, feet B.M.	13,390,435	13,936,771
Cordwood	7,677	10,765
Shingles	206,000	879,000
Railway ties	4,098	4,098
Fence posts	2,000	2,700

The quantity of lumber manufactured and sold within each agency will be found in the agents' reports appended hereto.

The area of timbered lands held under license and permit in the provinces of Manitoba, Alberta and Saskatchewan, and in the Railway Belt in the province of British Columbia, is as follows:—

Agency.	Under license.	Under permit.
	Square miles.	Square miles.
Manitoba	1,217·34	567·17
Alberta	2,019·25	34·83
Saskatchewan	1,858·49	112·89
British Columbia	1,724·82	4·51
Totals	6,819·90	719·40

During the year 116 timber berths were granted, of which two were license berths, 51 portable saw-mill and 63 cordwood berths.

GRAZING LANDS.

There were in force March 31, 1917, 4,060 grazing leases, covering a total area of 5,689,464 acres, in the provinces of Manitoba, Alberta, Saskatchewan and British Columbia, as follows:—

Manitoba	64,399
Alberta	2,509,527
Saskatchewan	2,724,368
British Columbia	391,170
Total	5,689,464

This is an increase over the previous year of 474,397 acres. During the year there were 1,008 new leases issued.

OFFICE WORK.

The following is a partial statement of the office work performed at Ottawa during the fiscal year:—

Letters received and recorded	28,991
" sent	49,773
Plans and sketches prepared	604
Timber berths applied for	212
Return of survey of timber berths examined and re-examined	5
Applications for grazing lands	1,524
" hay lands	15
Number of township plans on which timber berths, ranches and other reserves were plotted for agents	548
Other township plans examined for same purpose, which were clear.	908
Timber and grazing assignments registered	272
" ledger accounts posted	914
Fire-guarding accounts posted	734
Grazing accounts posted	4,060
Seizures checked and entered	257
Timber permits checked and entered	6,089
Hay permits checked and entered	3,800
Grazing leases issued in triplicate	1,010
Licenses for timber berths issued in duplicate	657
License berths granted	2
Portable saw-mill berths granted	51
Cordwood berths granted	63
Cash receipts issued in quadruplicate	2,262

B. L. YORK,
Controller.

STATEMENT "A."—Statement of Revenue for Fiscal Year 1916-17.

—	Timber.	Grazing.	Hay.	Registration.	Fire tax.	Improvements.	Total.
1916.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April	49,182 60	8,846 72	32 80	6 00	1,764 33	90 00	59,922 45
May	32,836 72	10,124 15	3,867 25	12 00	5,917 69	69 80	52,827 61
June	23,618 97	11,870 95	1,496 50	.....	6,257 82	60 00	43,304 24
July	47,522 40	8,987 47	1,767 25	57 10	937 55	286 00	59,557 77
August	43,401 36	8,823 28	582 70	19 00	2,092 78	180 00	55,099 12
September	26,344 20	6,207 65	86 95	28 00	188 48	350 00	33,205 28
October	52,739 51	11,286 99	16 40	4 00	436 88	40 00	64,523 78
November	14,147 76	10,087 66	53 55	15 00	31 26	30 00	24,365 23
December	17,985 29	12,540 06	15 95	43 00	42 45	21 00	30,647 75
1917.							
January	40,748 60	11,483 11	8 70	12 70	84 97	209 50	52,547 58
February	15,828 99	7,304 26	20 75	8 30	294 72	65 00	23,522 02
March	21,255 62	13,430 07	9 80	6 00	2 43	155 00	34,858 92
	385,612 02	120,992 37	7,958 60	211 10	18,051 36	1,556 30	534,381 75

STATEMENT "B."—Statement of Revenue from Timber for Fiscal Year 1916-17.

Agency.	Bonus under license.	Rental under license.	Royalty under license.	Permit fees, dues and rental	Seizures.	Total.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Battleford				590 42		590 42
" Head Office						
Calgary		1,745 30	9,413 35	5,434 14	2,908 75	19,501 54
" Head Office		2,798 14	14 90		40 00	2,853 04
Dauphin				856 30	590 35	1,446 65
" Head office				25		25
Edmonton	8,454 67	2,606 89	19,976 96	40,514 78	11,175 20	82,728 50
" Head office	705 60	1,903 51	390 01	116 00	5,555 06	8,670 18
Estevan						
" Head office						
Grande Prairie				786 30	93 20	879 50
" Head office						
High Prairie				167 82		167 82
" Head office						
Humboldt				56 21	49 60	105 81
" Head office						
Kamloops		2,515 83	5,874 90	2,565 49	13 30	10,969 52
" Head office		1,932 73		37 50	233 85	2,204 08
Lethbridge				62 20		62 20
" Head office						
Maple Creek				26 25		26 25
" Head office						
Medicine Hat				6 25		6 25
" Head office						
Moose Jaw				5 00		5 00
" Head office				50		50
New Westminster	8,107 95	13,006 64	52,012 50	18,464 40	1,172 24	92,763 73
" Head office		3 80				3 80
The Pas				26 25		26 25
" Head office						
Peace River				685 40	904 40	1,589 80
" Head office				34 15		34 15
Prince Albert		7,283 06	45,684 63	7,504 96	4,774 09	65,246 74
" Head office		165 05	200 60		460 88	826 53
Red Deer				722 66	201 94	924 60
" Head office						
Regina						
" Head office						
Revelstoke	2,100 00	2,335 04	25,571 79	638 69	10 50	30,656 02
" Head office		670 82				670 82
Saskatoon				76 75		76 75
" Head office						
Swift Current				3 00		3 00
" Head office						
Weyburn				75		75
" Head office						
Winnipeg		7,264 30	19,000 42	24,501 49	11,026 05	61,792 26
" Head office		178 90		8 45	140 81	328 16
Yorkton				131 40	319 75	451 15
" Head office						
Totals	19,368 22	44,410 01	178,140 06	104,023 76	39,669 97	385,612 02

SESSIONAL PAPER No. 25

STATEMENT "C."—Statement of Revenue from Grazing, Hay, Registration Fees, Fire-guarding Dues, and Improvements, for Fiscal Year 1916-17.

Agency.	Grazing.	Hay.	Registration fees.	Fire tax.	Improvements.	Total.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Battleford	1,171 68	770 20				1,941 88
" Head office	536 44				15 00	551 44
Calgary	4,856 37	43 10	11 00	19 03	100 00	5,029 50
" Head office	7,869 77					7,869 77
Dauphin	479 13	614 70				1,093 83
" Head office	201 15	16 90			25 00	243 05
Edmonton	444 86	966 70	56 10	291 97		1,759 63
" Head office	141 43				12 00	153 43
Estevan	3 25	24 30				27 55
" Head office	22 63					22 63
Grande Prairie	331 73	487 10				818 83
" Head office	58 71	5 00				63 71
High Prairie	21 50	78 90				100 40
" Head office						
Humboldt	216 20	293 55				509 75
" Head office	83 06					83 06
Kamloops	6,916 99	10 30	40 00	71 73		7,039 02
" Head office	670 89					670 89
Lethbridge	3,027 06	1 00	6 00			3,034 06
" Head office	5,807 39				70 00	5,877 39
Maple Creek	16,274 80	301 40			199 00	16,775 20
" Head office	5,829 01				20 00	5,849 01
Medicine Hat	21,597 16	101 85	34 00		360 00	22,093 01
" Head office	12,461 18				320 00	12,781 18
Moose Jaw	4,756 84	68 00				4,824 84
" Head office	4,003 49				146 50	4,149 99
New Westminster	0 72					0 72
" Head office						
The Pass						
" Head office						
Peace River	297 89	249 90				547 79
" Head office	74 00	5 10				79 10
Prince Albert	756 55	562 35		301 71		1,620 61
" Head office	101 11	1 00			21 00	123 11
Red Deer	565 89	336 10				920 99
" Head office	703 51	19 00			196 80	919 31
Regina	7 85	12 00				19 85
" Head office		5 50				5 50
Revelstoke	6 40		31 00	211 83		249 23
" Head office						
Saskatoon	226 48	459 45				685 93
" Head office	155 52					155 52
Swift Current	5,329 42	138 40			50 00	5,517 82
" Head office	11,236 06				21 00	11,257 06
Weyburn	550 40	229 30	2 00			781 70
" Head office	1,982 09	3 00				1,985 09
Winnipeg	364 64	1,949 40	31 00	367 78		2,712 82
" Head office	791 12	1 00				792 12
Yorkton	53 60	201 10				254 70
" Head office	6 40	3 00				9 40
	120,992 37	7,958 60	211 10	1,264 05	1,556 30	132,001 42
Fire-tax head office				16,787 31		16,787 31
				18,051 36		148,788 73

Referring to schedules B, C, and D in regard to the timber business of this district, you will note that operations increased over last season, while the prices obtained for lumber have been higher than for a number of years past.

Shipments were somewhat curtailed, however, owing to car shortage, while bush operations were handicapped by the scarcity of labour and high wages prevailing.

There is no reason to anticipate lower prices during the coming season, while, as the stock of lumber and logs on hand is lower than last year, there is some likelihood of a shortage of native lumber if the facilities for shipping same are at all improved.

W. E. TALBOT,
Crown Timber Agent.

SCHEDULE A.—Statement of Receipts from Crown Timber Agency at Calgary, for fiscal year ending March 31, 1917.

Month.	Ground Rent under License.	Royalty Dues under License.	Permit Fees, Dues and Rental.	Seizures.	Total Timber.	Grazing Land Rental.	Hay Permits, Fees and Dues.	Fire-guarding Fees.	Registration Fees.	Total.	Remarks.
1916.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts	$ cts.	$ cts.	$ cts.	$ cts.
April	390 80	1,938 89	534 26	36 40	2,900 35	220 93			Improvements 50 00	3,171 28	
May	898 77	13 87	525 24	3 75	1,441 63	281 97	14 90			1,738 50	
June	75 05		205 15	10 00	290 20	105 62	14 00			409 82	
July	108 62	1,602 05	220 23	10 00	1,940 90	581 29	11 50		Improvements 50 00	2,583 69	
August	120 52		104 04		224 56	351 11	2 70		Registration 11 00	569 37	
September	136 14	19 77	380 66	1,237 40	1,773 97	317 64		19 03		2,110 64	
October		3,485 51	1,336 95	62 44	4,884 90	318 51				5,203 41	
November	15 40		84 28	149 65	249 33	440 60				689 93	
December		408 43	897 51	250 62	1,556 56	407 51				1,964 07	
1917.											
January		1,920 68	466 25	159 00	2,545 93	451 26				2,997 19	January.
February		24 15	525 84	150 00	699 99	555 46				1,255 45	
March			153 73	839 49	993 22	844 47				1,837 69	
Totals	1,745 30	9,413 35	5,434 14	2,908 75	19,501 54	4,856 37	43 10	19 03	Registration 11 00 Improvements 100 90	24,531 04	
Collected at Head Office.											
1916.											
April	1,410 11				1,410 11	1,044 02				2,454 15	
May	448 00				448 00	677 77				1,125 77	
June	735 39				735 39	1,414 82				2,150 21	
July	204 64	14 90		40 00	259 54	781 63				1,041 17	
August						342 63				342 63	
September						133 87				133 87	
October						1,159 27				1,159 27	
November						847 04				847 04	
December						362 66				362 66	

1917.										
January						269 52				269 52
February						254 67				254 67
March						581 87				581 87
Totals	2,798 14	14 90		40 00	2,853 04	7,869 77				10,722 81
Grand totals	4,543 44	9,428 25	5,434 14	2,948 75	22,354 58	12,726 14	43 10	19 03	111 00	35,253 85

SCHEDULE B.—Showing the Saw-Mills Operating within the Calgary Agency, under Government License, for the fiscal year ending March 31, 1917.

No.	Mill-Owner.	Location of Mill.	Berth No.	Kind of Power.	Horse Power.	Capacity per 10 Hours.	Species of Timber Cut.	Lumber.		
								Manufactured.	Sold.	On Hand.
								Ft. B.M.	Ft. B.M.	Ft. B.M.
1	Eau Claire and Bow River	Calgary	468 and 318 H.	Steam and	325	50,000	Spruce and Pine	877,068	.....	877,068
2	Lumber Co., Ltd	Calgary	I.I, and 417 K.	Electricity	"	"	" "	.....	2,845,313	2,738,642
3	F. R. Pettepher	On Berth	1079	Steam	80	20,000	" "	1,464,564	1,546,528	906,980
4	F. R. Peunefather, Chas. Grant and Great West Lumber Co	Red Deer	253	Steam	450	80,000	" "	2,296,267	2,366,641	251,969
5	Carter & McEwen	"	1100	"	450	80,000	" "	2,296,268	2,296,268	.....
6	Phœnix Lumber Co., Ltd	On Berth	1119	"	60	10,000	" "	358,139	85,000	273,139
7	Valley Lumber Co., Ltd	"	1216	"	250	65,000	" "	1,913,537	1,596,546	2,148,381
8	V, W. De Mille	"	1389	"	35	15,000	" "	.....	.....	10,500
9	W. C. MacDougall	"	863	"	80	20,000	" "	.....	.....	.....
10	V. W. De Mille	"	1218	"	35	15,000	" "	.....	54,521	82,541
11	Linelaw Lumber Co., Ltd	High River	1292	"	250	40,000	" "	622,180	1,414,799	.....
12	W. A. Shields	On Berth	1246	"	100	25,000	" "	448,620	267,620	210,300
13	Hon. Peter McLaren	Blairmore	36A	"	250	45,000	" "	2,558,706	4,413,576	741,148
14	J. A. Card & Sons	On Berth	1040	"	35	15,000	" "	170,000	254,839	95,848
								13,005,409	17,141,651	8,336,516

SCHEDULE B.—Showing the Saw-Mills Operating within the Calgary Agency, etc.—*Continued.*

No.	Mill-Owner.	Log Count.			Average per Log.	Railway Ties.			Laths.			Number of Returns Made.	Date of Last Return.
		Logs Cut.	Logs Manufactured.	Logs on Hand,		Manufactured.	Sold.	On Hand.	Manufactured.	Sold.	On Hand.		
					Ft, B.M.								
1	Eau Claire and Bow River	72,877	30,695	72,877	28·57							4	Mar. 31, '17
2	Lumber Co., Ltd				37·5							4	Mar. 31, '17
3	F. R. Pettepher	26,045	16,576	9,469	43.1							4	Mar. 31, '17
4	F. R. Peunefather, Chas. Grant and Great West Lumber Co.		41,489	80,015	57·7				414,250	381,350	32,900	4	Mar. 31, '17
5	Carter & McEwen		41,491	99,606	53·83				444,250	381,400	36,800	4	Mar, 31, '17
6	Phoenix Lumber Co., Ltd	18,853	18,853		54·0	49,950	13,280	36,670				4	Mar. 31, '17
7	Valley Lumber Co,, Ltd	30,008	34,607	600	50·7							4	Mar. 31, '17
8	V. W. De Mille			2,688								4	Mar. 31, '17
9	W. C. MacDougall	777		777								3	Dec. 31, '16
10	V. W. De Mille											4	Mar. 31, '17
11	Linelaw Lumber Co., Ltd		15,696		39·63				143,800	145,800		4	Mar. 31, '17
12	W, A. Shields	3,950	10,296	4,014	37·84							4	Mar. 31, '17
13	Hon. Peter McLaren	99,773	62,217	121,804	45·35							5	Mar. 31, '17
14	J. A. Card & Sons	6,253	4,630	1,957	33·3							5	Mar. 31, '17
		258,536	276,550	393,807		49,950	13,280	36,670	1,002,300	908,550	69,700		

SCHEDULE C.—Showing the Mills (including the Portable Mills) operating within the Calgary Agency, under Government Permits, for the fiscal year ending March 31, 1917.

No.	Mill owner.	Location of mill.	Berth No.	Species of timber cut.	Lumber.			Log Count.			Average per log. Ft. B.M.	No. of returns made.	Date of last return.	Remarks.
					Manufactured. Ft. B.M.	Sold. Ft. B.M.	On hand. Ft. B.M.	Logs cut.	Logs manufactured	Logs on hand.				
1	Geo. Cummings.....	On Berth...	2,120	Spruce &	Nil.	505,989	Nil.	Nil.	Nil.	Nil.	. .	4	Mar. 31, '17	
2	J. T. Johanneson & Sons.	" ..	2,101	" Pine	133,896	68,974	147,548	Nil.	3,452	Nil.	38.78	4	Mar. 31, '17	
3	Chas. Stubbs	" ..	2,414	Fir " "	71,640	136,863	127,812	Nil.	Nil.	1,701	66·5	4	Mar. 31, '17	
4	W. T. Hagen	" .	1,586	Spr. & Pine.	Nil.	8,006	58,007	Nil.	Nil.	1,915	. .	4	Mar. 31, '17	
5	J. P. McPherson.....	" ..	1,997	" ..	Nil.	63,272	7,678	Nil.	Nil.	1,739	.....	4	Mar. 31, '17	
6	Edward Mason.....	" ..	31	" ..	40,414	48,772	8,625	Nil.	1,127	1,525	35·86	4	Mar. 31, '17	
7	Pelletier Lumber Co....	Blairmore ..	23A	" ..	1,417,960	1,552,471	9,261	34,878	30,728	30,900	40·0	4	Mar. 31, '17	
8	Brazeau Collieries, Ltd.	Nordegg....	16	" ..	432,042	349,323	88,713	88,079	97,834	13,958	67·6	4	Mar. 31, '17	
9	Napoleon Lacoste.....	On Berth...	45	" ..	Nil.	Nil.	Nil.	29,643	32,107	4,516	.....	4	Mar. 31, '17	Mfg. into mining timber.
10	E. R. Baker	" ..	2,295	" ..	140,688	140,688	Nil.	1,671	2,241	2,171	62·7	4	Mar. 31, '17	
11	Foothills Lbr. Co., Ltd..	" ..	1,938	" ..	79,261	99,792	24,799	Nil.	2,410	1,108	29·14	4	Mar. 31, '17	
12	H. A. Hansen	" ..	50	" ..	15,500	15,500	Nil.	1,076	619	457	25·06	4	Mar. 31, '17	
13	Geo. Cummings.....	" ..	2,389	" ..	56,515	56,515	Nil.	849	849	Nil.	66·7	1	Mar. 31, '17	
14	Finlay McLaren.....	" ..	40	" ..	Nil.	Nil.	Nil.	4,323	Nil.	4,323	.....	1	Mar. 31, '17	
15	C. O. Johanneson.....	" .	2,346	" ..	Nil.	Nil.	Nil.	4,629	Nil.	4,629	.. .	1	Dec. 31, '16	
16	J. A. Burt..... ...	" ..	48	" ..	93,959	32,270	61,689	946	261	685	.....	2	Sept. 30, '16	
					2,481,875	3,088,435	534,132	166,094	171,628	69,627				

SESSIONAL PAPER No. 25

SCHEDULE D.—General Office Return of the Crown Timber Agency, Calgary, for fiscal year ending March 31, 1917.

Particulars.	Number, etc.	As compared with previous year increase.	As compared with previous year decrease.
Letters received	69,630		41,635
Letters written	63,135		29,198
Permits subject to dues issued	82	13	
Free permits issued	161		10
Seizures made	7		17
Mill returns received and verified	231		4
Mills operating under Government license	14	1	
" Government permits	16	Nil.	Nil
Quantity of lumber manufactured, under license	13,005,409	3,822,870	
" sold, " "	17,141,651		2,545,196
" on hand, " "	8,336,516		3,306,020
Hay permits issued	592		214

REPORT OF CROWN TIMBER AGENT, EDMONTON.

The revenue, $84,488.13, shows a decrease from the preceding year, of $15,-692.87. This is accounted for by the non-operation of the Edmonton firms, John Walter, Limited, D. R. Fraser & Company, and the Edmonton Lumber Company, who took out no logs this year.

Owing to their disastrous experiences in previous years, through floods, I understand these firms have practically decided not to again use the Saskatchewan river for driving their logs, and have been awaiting some other means of transportation before again operating their limits. I am pleased to say there is a prospect of a railway being built before long through a good portion of their timber and I trust they will again be operating this year.

There is a great demand for lumber at the present time, at prices better than have been received for years, and I look for a generous increase in the timber business for the coming year.

A. NORQUAY,
Crown Timber Agent.

SCHEDULE A.—Statement of Receipts from Crown Timber Agency at Edmonton, for fiscal year ending March 31, 1917.

Month.	Bonus under License.	Ground rent under License.	Royalty dues under License.	Permit Fees, Dues & Rental.	Seizures.	Total Timber.	Grazing Land Rental.	Hay Permits, Fees & Dues.	Fire-guarding Fees.	Registration Fees.	Total.
1916.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April		516 95	3,034 54	2,612 91	563 63	6,728 03	2 68				6,730 71
May		600 57	991 40	2,539 96	951 82	5,083 75	35 20	522 25	31 13		5,672 33
June		174 70	4 43	406 76	109 85	695 74	18 07	195 60			909 41
July	8,454 67	454 38	1,655 43	1,783 70	1,248 07	13,596 25	66 08	144 25	46 85	45 10	13,898 53
August		207 12	4,427 75	12,515 27	264 12	17,414 26	22 56	83 00			17,519 82
September			282 95	10,421 84	53 91	10,758 70	41 93	7 50	69 00		10,877 13
October		410 70	5,319 87	359 39	91 57	6,181 53	26 43	2 40	99 76		6,310 12
November		1 28	1,473 47	1,183 57	1,308 52	3,965 84	22 33	0 20		11 00	4,000 37
December		11 40	119 04	1,026 15	168 80	1,325 39	25 07	1 00			1,351 46
1917.											
January			434 15	3,433 40		3,867 55	20 20	4 00			3,891 75
February		218 75	2,231 93	2,568 88	810 75	5,830 31	62 21	5 20	45 23		5,942 95
March		11 04	2 00	1,662 95	5,604 16	7,280 15	102 10	1 30			7,383 55
Totals	8,454 67	2,606 89	19,976 96	40,514 78	11,175 20	82,728 50	444 86	966 70	291 97	56 10	84,488 13
Collected at head office: 1916.											
April			100 00			100 00	14 40				114 40
May		10 20	114 00	8 00		132 20	6 40				138 60
June	705 60	72 55				778 15	17 48				795 63
July		1,820 76	176 01	8 00		2,004 77	9 60				2,014 37
August					5,540 06	5,540 06	3 30				5,543 36
September							19 16				19 16
October							11 06				11 06
November							3 20				3 20
December							12 02				12 02
1917.										Improvements.	
January					15 00	15 00	8 53			12 00	35 53
February				100 00		100 00	8 06				108 06
March							28 22				28 22
Totals	705 60	1,903 51	390 01	116 00	5,555 06	8,670 18	141 43			12 00	8,823 61
Grand totals	9,160 27	4,510 40	20,366 97	40,630 78	16,730 26	91,398 68	586 29	966 70	291 97	56 10	93,311 74

Imp. 12 00

SCHEDULE B.—Showing the Saw-Mills operating within the Edmonton Agency under Government License, for the fiscal year ending March 31, 1917.

Mill-owner.	Location of Mill.	Berth No.	Species of Timber Cut.	Lumber.			Log Count.		
				Manufactured.	Sold.	On Hand.	Logs Cut.	Logs Manufactured.	Logs on Hand.
				Ft. B. M.	Ft. B. M.	Ft. B. M.			
Chas. Cropley	Berth	302	Spruce and poplar.	32,000	25,600	6,400	405	405	813
D. R. Fraser & Co., Ltd	Edmonton	956	"	183	183			3	
Jno. Walter	"	956	"	8,235	8,235		101	135	
Edmonton Lumber Co., Ltd	"	963	"	881	881		13	20	
John Walter	"	1008	"	3,843	3,843		58	63	
D. R. Fraser & Co	"	1008	"	1,715	307,707	744,692	6	31	
Blain & McKelvey	Berth	1019	"	114,560	259,581	131,130	2,864	2,864	
Bell & McPhee	"	1919	"						1,462
North West Lumber Co., Ltd	Edmonton	2051	"				6,000		6,000
Phœnix Lumber Co., Ltd	Ernsted	1046	"	348,404	213,243	135,161	9,300	9,300	
" "	"	1094	"				13,749		13,749
[1], [2]W. A. Charlton	Berth	129 (bk. No. 1.)	Tam., pine, etc.	1,814,504	1,875,745		10,540	25,820	
Phœnix Lumber Co., Ltd	Ernsted	1093	Sp'ce, pine, etc.		870,379	118,792	10,845		10,845
" "	"	1122	Sp'ce and poplar.						
Edmonton Lumber Co., Ltd	Edmonton	1125	"	2,860	1,884,925		34	61	
" "	"	1156	"	233	233		3	6	
J. J. Anderson	Berth	1185	"	50,000	14,278	236,624	1,516	2,016	
Jno. Walter, Ltd	Edmonton	1211	"	305	305		4	5	
Dr. David Lawson	Athabasca	2150	"	1,177,562	1,217,053		7,600	31,611	7,600
D. R. Fraser & Co., Ltd	Edmonton	1242	"	610	610		4	10	
Blain & McKelvey	Battle Lake	1273	Spruce, and pine.	96,660	110,234	88,744	2,148	2,148	
The Jasper Park Colls., Ltd	Pocahontas	1279	Spruce, tamarack and pine.			1,505,652			
North West Lumber Co., Ltd	Edmonton	2072	Spruce, etc	6,414,768	6,414,768		9,464	101,083	134,533
T. O. Davis	Prince Albert	1301	"		58,570				
Guy W. Mariott	Edmonton	1314	"				2,051		2,051
John R. McIntosh	Smith	1320	"				7,672		11,686
A. Belcher	Hargwen	1330	"		471,273				5,126
"	"	1331	"		1,801,967		9,874		9,874
Eugene H. Etter	Bickerdike	1343	"	1,121,337	1,085,334	162,765	48,182	36,273	15,725
Lawrence Garneau	St. Paul des Metis	1172	"		118,018	308,986			2,353
Ernest E. Chauvin	Smith	1377	"	903,000	903,000		25,863	11,000	14,863

North West Lumber Co., Ltd ...	Edmonton	1379	"	13,347,486	12,471,244	1,229,773	128,892	207,492	39,916
[3] " " ...	"	2161	"	.....	661,608	.....	.....	.....	.....
Dr. D. J. Dunn	Berth	1394	"	.....	.....	95,936	.....	.....	.....
[4]J. Frank Wright	Chisholm	1397	"	130,825	130,825	.....	18,154	1,800	16,354
Jno. Walter, Ltd	Unmarked logs.....	....	"	166,393	166,393	.....	448	756	.....
"	Edmonton.....	1784	"	2,632	579,729	.....	23	45	.....
"	"	1242	"	16,287	16,287	.....	240	267	.....
"	"	1092	"	.....	.....	.....	.....	.....	.....
				25,755,283	31,672,051	4,764,655	316,053	433,214	292,950

[1] Cordwood.—Manufactured 37 cords; sold 37 cords.

[2] Manufactured Mining Timber.—Manufactured 5,268; sold 5,268.

SCHEDULE B.—Showing the Saw-Mills operating within the Edmonton Agency under Government License, for the fiscal year ending March 31, 1917—*Continued.*

Mill-owner.	Average per Log.	Railway Ties.			Laths.			Shingles.			Number of Returns Made.	Date of Last Return.
		Manufactured.	Sold.	On Hand.	Manufactured.	Sold.	On Hand	Manufactured.	Sold.	On Hand.		
	Ft. B. M.											
Chas. Cropley	79										4	Mar. 31, '17
D. R. Fraser & Co., Ltd	61										1	Dec. 31, '16
Jno. Walter	61										1	Dec. 31, '16
Edmonton Lumber Co., Ltd	41										1	Dec. 31, '16
John Walter	62										1	Dec. 31, '16
D. R. Fraser & Co	55					774,280					1	Dec. 31, '16
Blain & McKelvey	40					53,500					5	Sept. 30, '16
Bell & McPhee											3	Mar. 31, '17
North West Lumber Co., Ltd											4	Mar. 31, '17
Phœnix Lumber Co., Ltd	38										3	Dec. 31, '16
" "		27,418	47,956	24,462		[1]		[2]			4	Mar. 31, '17
[1], [2]W. A. Charlton	70		750								6	Mar. 31, '17
Phœnix Lumber Co., Ltd						131,950	26,400				4	Mar. 31, '17
" "		17,889	34,115	2,452							4	Mar. 31, '17
Edmonton Lumber Co., Ltd	47					35,150					1	Dec. 31, '16
" "	39										1	Dec. 31, '16
J. J. Anderson	25										3	Sept. 30, '16
Jno. Walter, Ltd	61										1	Dec. 31, '16
Dr. David Lawson	37											
D. R. Fraser & Co., Ltd	61										1	Dec. 31, '16
Blain & McKelvey	45										4	Sept. 30, '16
The Jasper Park Colls., Ltd											4	Mar. 31, '17
North West Lumber Co., Ltd	63				1,171,450	1,171,450					4	Mar. 31, '17
T. O. Davis											1	May 29 '17
Guy W, Mariott											3	Dec. 31, '16
John R. McIntosh											4	Mar. 31, '17
A. Belcher											3	Mar. 31, '17
"			1,657								4	Mar. 31, '17
Eugene H. Etter	31										4	Mar. 31, '17
Lawrence Garneau										22,000	3	Sept. 30, '16
Ernest E. Chauvin	82										4	Mar. 31, '17

North West Lumber Co., Ltd.....	64	.....	.....	.....	2,899,000	2,685,150	328,850	.....	.....	.....	4	Mar. 31, '17
[3] " "	.....	14,355	14,355	.....	.....	.....	.....	.....	.....	.....	1	June 30, '16
Dr. D. J. Dunn	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
[4]J. Frank Wright	75	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	Dec. 31, '16
Jno. Walter, Ltd.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	Dec. 31, '16
"	60	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	Dec. 31, '16
"	61	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	Dec. 31, '16
"	.....	18,483	18,483	.....	.....	.....	.....	.....	.....	.....	4	Mar. 31, '17
	55	78,145	117,316	26,914	4,070,450	4,851,480	355,250	.....	.....	22,000	...	

[3] Tel. poles.—Cut, 1,895; sold, 1,895. [4] Piling.—Cut, 7,000 l. feet; sold 7,000 l. feet.

SCHEDULE C.—Showing the Mills (including the Portable Mills) operating within March

Mill-owner.	Location of mill	Berth No.	Species of Timber cut.	Lumber.		
				Manufactured. Ft. B.M.	Sold. Ft. B.M.	On hand. Ft. B.M.
John Walter, Ltd.	Edmonton	1306 O. in C.	Spr. & pop., etc.	1,159	900,764	396,865
D. R. Fraser & Co., Ltd.	"	1306 O. in C.	"	772	772	
John Walter, Ltd.	"	Spec. O. in C.	"	366	366	
"	"	Pt. 140029	"	2,257	2,257	
D. R. Fraser & Co., Ltd.	"	Pt. 148090	"	183	183	
John Walter, Ltd.	"	Pt. 148090	"	25,979	25,979	
D. R. Fraser & Co., Ltd.	"	Pt. 140029	"	122	122	
John Walter & D. R. F. & Co., Ltd.	"	T.B. 1487	"	5,490	5,490	
Emile Baril	Rife	T.B. 1773	"		69,210	
J. B. Scofield	Downing	T.B. 1792	"	58,724	37,343	37,691
John Yaczkowski	Westlock	1879	"		265,773	
Perry Snyder	Berth	1885	"		26,386	49,836
P. Maisonneuve	"	1902	"		12,400	67,190
Chas. M. Mearns	Grouard	1921	"		47,381	
A. W. de H. Smith	Paddle River	1926	"			
Wm. Brunelle	St. Paul des Metis.	1937	"		72,906	280,397
Jas. A. Evans	Lake Saskatoon	1993	"		31,439	
Narcisse Dery	Bonnyville	1996	"		50,831	
St. Bernard Mission	Grouard	2047	"	43,785	22,427	26,510
F. LeSerec	P. R. Crossing	2037	"			
H. A. George	"	2094	"	333,200	279,949	53,251
Henry Roberts	Greencourt	2098	"	93,422	109,005	
The Argonauts, Ltd.	Grande Prairie	2136	"		134,474	
George C. Garnett	Spirit River	2144	"			
Thos. E. Cooke	Grande Prairie	2145	"		160,590	
F. J. Dodge	Bluesky	2146	"	100,000	55,471	171,993
Magar & St. Germain	P. R. Crossing	2151	"	15,800	29,792	
A. G. Trelle	Lake Saskatoon	2156	"	43,000	60,002	
A. E. Drader	Lacombe	2160	"		69,765	71,642
The Hudson's Bay Co.	Edmonton	2172	"		15,964	15,630
G. A. MacPherson	High Prairie	2165	"		10,299	8,532
C. E. Hughes	Saddle Lake	2238	"			
A. Berry	Ft. Saskatchewan.	2175	"	400,000	246,476	433,833
Wm. Brunelle	St. Paul des Metis.	2170	"		14,268	591,250
I. B. Oldham	Lake Saskatoon	2205	"		25,000	
Jas. L. Harrison	Swan Riv. Settlem.	2167	"	20,220	64,384	
John Zaczkowski	Westlock	2219	"	27,590		263,720
Jos. E. Bellemare	Bonnyville	2192	"	46,420	8,774	129,081
Emile Baril	Durlingville	2184	"		18,773	209,227
O. S. Radway	Radway Centre	2180	"		800	148,704
Ray Varin	Plamondon	2191	"	285,300	156,114	153,994
David Graham	Marsden, Sask.	2220	"	162,736	169,936	
Smith & Van Camp	Beaver Crossing	2209	"		19,404	13,410
J. H. Harris & Sons	Grande Prairie	2216	"		13,099	
Tupper & Davidson	Athabaska	2218	"		2,200	
Fort McMurray Mercantile Co., Ltd.	McMurray	2239	"	104,444	21,613	104,745
George Magar	P. R. Crossing	2276	"		68,527	
Wm. Comrie	Wahstao	2223	"	44,756	2,935	53,207
Spirit River Lbr. Co., Ltd.	Spirit River	2243	"		166,650	180,488
F. P. Paradis	Lac La Biche	2222	"	70,000	29,941	75,059
C. T. Nelson	Edmonton	2262	"	321,733	321,733	
P. A. Robb	Edson	2264	"			
Joseph Baril	Therien	2225	"	160,700	17,784	142,916
Geo. C. Garnett	Spirit River	2263	"	652,680	382,727	269,953
The Argonauts, Ltd.	Grande Prairie	2252	"	595,008	520,771	105,935
Henry Clemes	Barrhead	2291	"	622,448	505,550	20,352
J. E. Van Horne	Lake Saskatoon	2256	"	316,500	232,597	83,903
Geo. Lumber Co., Ltd.	P. R. Crassing	2270	"	83,336	83,336	
Hector Ross	Sangudo	2299	"	145,773	71,350	74,423
Thos. E. Cooke	Grande Prairie	2311	"	303,429	208,187	95,242
Emile Baril	Durlingville	2318	"			
A. G. Trelle	Lake Saskatoon	2310	"	66,368	11,898	54,470

the Edmonton Agency, under Government Permits, for the fiscal year ending 31, 1917.

Log count.			Average per log. Ft. B.M.	Railway ties.		No. of returns made.	Date of last return.	Shingles.		
Logs cut.	Logs manufactured	Logs on hand.		Manufactured	Sold.			Mfg.	Sold.	On hand.
7	19		61			1	Dec. 31, '16			
4	14		55			1	" 31, '16			
6	6		61			1	" 31, '16			
36	37		61			1	" 31, '16			
3	3		61			1	" 31, '16			
52	62			761	761	1	" 31, '16			
2	2		61			1	" 31, '16			
89	90		61			1	" 31, '16			
						3	" 31, '16			
	1,736	1,119	33			4	" 31, '16			
						4	Mar. 31, '17			
						4	Dec. 31, '16			
						3	" 31, '16			
									23,750	
		452								
						4	Mar. 31, '17		56,000	119,500
						4	" 31, '17		709,000	598,250
						1	" 31, '16			
	1,144	964	38			3	Sept. 30, '16			20,000
										5,000
	5,600	355	60			4	Mar. 31, '17			
	1,600		58			2	June 30, '16			
						1	" 30, '16			
						2	" 30, '16		15,750	
						1	" 30, '16			
	1,613		62			4	Mar. 31, '17			
	204		77			1	June 30, '16			
	431		100			3	Dec. 31, '16			
						3	Sept. 30, '16			
						3	Dec. 31, '16			
						4	Feb. 31, '17			
		300				3	Dec. 31, '16			
9,550	8,000	7,550	50			2	" 31, '16			
						3	" 31, '16			355,000
		2,000				4	Mar. 31, '17			
300	400		50			4	" 31, '17			
249	658		40			4	" 31, '17			
	667		70			1	June 30, '16			
						4	Mar. 31, '17		20,000	
						1	June 30, '16			
	3,800	500	75			4	Mar. 31, '17			
2,800	3,150		51			2	June 30, '16			
						3	Dec. 31, '16			
						1	June 30, '16			
						2	Mar. 13, '17			
595	595					2	Sept. 30, '16			
						4	Mar. 31, '17			
512	802		56			4	Dec. 31, '16			
						4	Mar. 31, '17			
	1,200		58			3	Sept. 30, '16			
	5,211		62			3	Dec. 26, '16			
350		350				3	" 31, '16			
4,700	3,525	1,175	45			4	" 31, '16	127,000	14,500	112,500
	8,530		78			4	June 31, '17			
7,210	12,436	7,210	48			4	Mar. 31, '17			
5,423	7,333	254	85			4	" 31, '17			
1,762	4,472		71			4	" 31, '17			
2,647	947	3,200	88			3	" 31, '17			
2,487	2,487		58			3	Dec. 31, '16			
6,106	6,106		49			4	Mar. 31, '17			
750	200	550				4	" 31, '17	42,000	40,000	2,000
2,554	791	1,763	84			3	Dec. 31, '16			

SCHEDULE C.—Showing the Mills (including the portable mills) operating within 31, 1917.—

Mill-owner.	Location of mill.	Berth No.	Species of Timber cut.	Lumber.		
				Manufactured. Ft. B.M.	Sold. Ft. B.M.	On hand. Ft. B.M.
			Spr. pop., etc.			
R. E. Hawkey	Mosside	2301	"	245,543	245,543	
S. E. Nelson	Yeoford	2315	"	15,425	15,425	
Peter McPhee	Edmonton	2378	"	100,000	63,000	37,000
George Hening	"	2376	"			
George D. McRae	P. R. Crossing	2373	"	224,040	68,209	155,831
Clarke Bros	Pembina	Pt. *457	"	89,818	77,818	12,000
Spirit Lbr. Co., Ltd.	Spirit River	2313	"			
Geo. R. Latimer	"	Pt. *443	"			
Thos. E. Cooke	Grande Prairie	2368	"	165,000		165,000
Olaf Horte	Lake Saskatoon	2365	"	86,729	76,729	10,000
L. H. Adair	"	2319	"	565,500	203,513	361,987
P. Maisonneuve	Falher	2323	"	84,706	56,506	28,200
Jos. L. Harrison	Kunuso	2390	"	77,241	30,679	46,562
Archie Rendall	Edmonton	2372	"			
				6,807,702	6,719,589	5,200,029

the Edmonton Agency, under Government Permits, for the fiscal year ending March *Continued.*

Log count.			Average per log. Ft. B.M.	Railway ties.		No. of returns made.	Date of last return.	Shingles.		
Logs cut.	Logs manufactured	Logs on hand.		Manufactured	Sold.			Mfg.	Sold,	On hand.
3,532	3,532	.....	69	.....	.....	4	Mar. 31, '17	.....	.....	.....
500	400	100	38	.....	.....	3	Mar. 31, '17	.....	.....	.....
17,300	1,300	16,000	77	.....	.....	1	Feb. 24, '17	.....	.....	.....
18,200	.....	18,200	.....	.....	.....	1	Mar. 14, '17	.....	.....	.....
4,802	1,602	3,200	139	.....	.....	1	" 31, '17	.....	.....	.....
2,064	2,064	.....	43	.....	.....	1	" 31, '17	.....	.....	.....
3,063	.....	3,063	.....	.....	.....	3	" 31, '17	.....	.....	.....
4,250	.....	4,250	.....	.....	.....	1	" 31, '17	.....	.....	.....
13,040	2,805	10,235	59	.....	.....	1	" 31, '17	.....	.....	.....
4,204	1,204	3,000	72	.....	.....	1	" 31, '17	.....	.....	.....
6,700	6,700	.....	84	.....	.....	2	" 31, '17	.....	.....	.....
1,315	705	610	120	.....	.....	1	" 31, '17	.....	.....	.....
1,003	1,003	.....	77	.....	.....	1	" 31, '17	.....	.....	.....
2,400	.....	2,400	.....	.....	.....	1	" 31, '17	.....	.....	.....
130,567	105,186	88,800	65	761	761			169,000	879,000	1,212,250

SCHEDULE D.—General Office Return of the Crown Timber Agency, Edmonton, for the fiscal year ending March 31, 1917.

Particulars,	Number, etc.	As Compared with Previous Year.	As Compared with Previous Year.
		Increase.	Decrease.
Letters received	29,850	These figures are approximate.	
Letters written	45,300		
Permits subject to dues issued	388	70	
Free permits issued	799		295
Seizures made	83		8
Mill returns received and verified	342	41	
Mills operating under Government license	18	2	
" " Government permits	75	7	
Quantity of lumber manufactured, under license	25,755,283	9,947,323	
" " sold, "	31,672,051	7,439,659	
" " on hand, "	4,764,655		6,356,909
Hay permits issued	618	48	

REPORT OF CROWN TIMBER AGENT, PRINCE ALBERT.

Schedule A. Revenue derived from the timber and grazing branch of this agency.

Schedule B. Showing the saw-mills operating within this agency under government license.

Schedule C. Showing the mills, including portable saw-mills, operating under government permits.

Schedule D. General office return.

Owing to the increased demand on the prairies and in the United States for lumber, a marked increase is noted in the manufacture and sales of lumber from mills operating under government license.

The prevailing high price of lumber, no doubt, in a large measure, accounts for the increase of permits issued to settlers to cut timber for their own use.

A remarkable increase in the amount of cordwood manufactured over previous years is noted. This is largely due to the growing demand for wood as fuel, due possibly to the unsettled conditions among the miners in coal-mining districts. We anticipate a greater increase in the quantity of cordwood manufactured during the current year.

The operations of lumbermen, settlers and cordwood cutters should be more carefully supervised in order to prevent, as far as possible, the waste of timber, through careless slashing and leaving the brush, so as to endanger the standing timber through fire.

The transfer of twenty-nine license berths from Winnipeg Crown Timber agency to this agency has considerably increased the work of this branch.

R. M. TREEN,
Acting Crown Timber Agent.

SCHEDULE A.—Statement of Receipts from Crown Timber Agency, at Prince Albert, for the fiscal year ending March 31, 1917.

Month.	Ground Rent under License.	Royalty Dues under License.	Permit Fees, Dues and Rental.	Seizures.	Total Timber,	Grazing Land Rental,	Hay Permits, Fees & Dues	Fire-guarding Fees.	Registration Fees.	Total.
1916.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April	6,701 49	7,458 94	377 58	533 25	15,071 26	102 28	0 10			15,173 64
May	54 55	467 99	913 46	632 90	2,068 90	26 48	245 30	121 87		2,462 55
June			56 33	795 25	851 58	26 01	94 55			972 14
July		10,254 16	365 90	45 50	10,665 56	119 39	116 75			10,901 70
August		1 60	1,747 81	1,069 40	2,818 81	26 18	59 30			2,904 29
September	101 44	215 97	94 50	347 12	759 03	24 79	14 80			798 62
October	91 67	14,509 56	586 54	855 55	16,043 32	15 40		69 22		16,127 94
November	83 67	15 30	203 80	28 50	331 27	42 13	6 20	29 26		408 86
December			283 45		283 45	74 23	11 85			369 53
1917.										
January	207 44	12,761 11	1,010 57	29 08	14,008 20	158 14	1 50	81 36		14,249 20
February			1,092 34	307 04	1,399 38	47 67	12 00			1,459 05
March	42 80		772 68	130 50	945 98	93 85				1,039 83
Totals	7,283 06	45,684 63	7,504 96	4,774 09	65,246 74	756 55	562 55	301 71		66,867 35
Collected at Head office:										
1916.										
April										
May	97 45				97 45	3 20				100 65
June	67 60				67 60	1 60				69 20
July										
August						2 55				2 55
September						39 53	1 00		Imp. 10 00	50 53
October						11 12				11 12
November						2 08				2 08
December						2 14				2 14
1917.										
January						2 05			Imp. 11 00	13 05
February				460 88	460 88	15 74				476 62
March		200 60			200 60	21 10				221 70
Totals	165 05	200 60		460 88	826 53	101 11	1 00		21 00	949 64
Grand totals	7,448 11	45,885 23	7,504 96	5,234 97	66,073 27	857 66	563 35	301 71	21 00	67,816 99

SCHEDULE B.—SHOWING the Saw-mills operating within the Prince Albert Agency under Government License, for the fiscal year ended March 31, 1917.

Mill-owner.	Location of mill.	Berth No.	Kind of Power.	Species of Timber cut.	Lumber.			Log Count.		
					Manufactured Ft. B.M.	Sold Ft. B.M.	On hand Ft. B.M.	Logs cut.	Logs Manufactured.	Logs on hand.
Prince Albert Lbr. Co., Ltd.	Prince Albert	66a	Steam.	Spruce.	4,878,335	10,180,943	Nil.	23,064	76,704	23,064
" "	"	474	"	"	16,985,959	16,985,959	"	169,099	287,181	169,099
" "	"	245	"	"	Nil.	Nil.	"	294,012	Nil.	294,012
" "	"	698	"	"	2,317,257	2,317,257	"	Nil.	39,600	Nil.
" "	"	710	"	"	Nil.	Nil.	"	107,469	Nil.	107,469
" "	"	868	"	"	12,127,504	4,087,974	8,039,530	Nil	207,249	36,705
" "	"	708 and 802	"	"	3,448,162	3,448,162	Nil.	"	57,995	Nil.
" "	"	691	"	"	2,594,918	2,594,918	"	54,776	38,777	127,886
" "	"	633	"	"	210,484	210,484	"	Nil.	3,597	Nil.
Big River Lbr. Co.	Big River	1048	"	"	Nil.	Nil.	"	"	Nil.	"
Sask. Lumber Co	Crooked River	961	"	"	2,713,115	3,141,318	25,120	10,530	40,424	"
"	"	1785	"	"	Nil.	Nil.	Nil.	25,005	Nil.	25,005
Finger Lbr, Co	The Pas	1274	"	"	14,090,202	8,711,061	14,219,378	82,513	230,859	157,607
"	"	1267	"	"	Nil.	Nil.	Nil.	48,465	Nil.	48,465
"	"	920	"	"	7,855,964	8,567,555	"	78,454	149,154	64,160
Ruby Lake Lbr. Co.	Ruby Lake	964	"	"	44,770	44,770	"	Nil.	1,164	Nil.
Fritz Stormont Lbr. Co	"	964	"	"	Nil.	Nil.	"	52,061	Nil.	52,061
Red Deer Lbr. Co.		823	"	"	1,254,053	6,522,972	5,789,659	124,394	18,930	167,065
H. R. Knudson	Dahlton	1158	"	"	60,000	11,662	187,964	Nil.	1,320	4,692
H. Pearse and Edworthy Bros.	Peesane	2036	"	"	1,023,400	1,089,410	Nil.	30,159	24,485	27,159
Ladder Lake Lbr. Co	Big River	1048	"	"	29,123,654	31,951,433	6,966,383	284,575	579,227	356,605
"	"	1049	"	"	5,011,662	5,011,662	Nil.	326,079	97,411	364,089
H. Blackburn	Bannock	1681	"	"	161,550	Nil.	161,550	17,774	4,000	13,774
Totals					103,900,989	104,877,540	33,389,584	1,728,429	1,858,077	2,638,857

SCHEDULE B.—Showing the Saw-Mills operating within the Prince Albert Agency under Government License, for the fiscal year ended March 31, 1917—*Continued.*

Mill-owner.	Railway Ties.			Laths.			Cordwood.			Number of Returns made.	Date of last return.	Remarks.
	Manufactured	Sold.	On hand.	Manufactured.	Sold.	On hand.	Manufactured	Sold.	On hand.			
Prince Albert Lbr. Co., Ltd				903,400	2,405,350	951,550				3	Dec. 31, 1916.	
" "				3,664,750	3,664,750	Nil.				4	Mar. 31, 1917.	
" "				Nil.	Nil.	"				4	" 31, 1917.	
" "				404,100	404,100	"				4	" 31, 1917.	
" "				Nil.	Nil.	"				4	" 31, 1917.	
" "				2,115,050	"	2,115,050				4	" 31, 1917.	
" "				812,500	812,500	Nil.				1	June 30, 1916.	
" "				496,750	496,750	"				4	Mar. 31, 1917.	
" "										3	Dec. 31, 1916.	
Big River Lbr. Co.	Nil.	98,896	Nil.							1	Nov. 2, 1916.	35,560 ft. Piling sold.
Sask. Lumber Co				Nil.	Nil.	Nil.	69	69	Nil.	4		
"	Nil.	Nil.	Nil.	"	"	"	100	100	"	4	Mar. 31, 1917.	
Finger Lbr. Co				1,279,250	1,318,750	"				4	" 31, 1917.	
"										4	" 31, 1917.	
"				4,364,250	2,315,900	3,061,300				4	" 31, 1917.	
Ruby Lake Lbr. Co				Nil.	55,000	Nil.				1	Dec. 31, 1916.	Sold to Fritz Stormont
Fritz Stormont Lbr. Co				"	Nil.	"				2	Mar. 31, 1917	Lbr. Co.
Red Deer Lbr. Co.				500,000	4,088,950	659,000				2	" 31, 1917.	
H. R. Knudson										3	Dec. 31, 1916.	
H. Pearse and Edworthy Bros.										4	Mar. 31, 1917.	4,730 ft. Piling sold, nil
Ladder Lake Lbr. Co				14,091,450	13,074,900	5,483,400				4	" 31, 1917.	on hand.
"				2,446,700	2,446,700	Nil.	4,021	2,500	1,521	4	" 31, 1917.	
H. Blackburn										2	" 31, 1917.	
Totals	Nil.	98,896	Nil.	31,078,200	31,083,650	12,270,300	4,021	2,500	1,521			

SCHEDULE C.—Showing the Mills (including the Portable Mills) operating within March

Mill Owner.	Location of Mill.	Berth No.	Species of timber cut.	Lumber.		
				Manufactured	Sold.	On Hand.
				Feet B.M.	Ft. B.M.	Ft. B.M.
Bank of Ottawa	Prince Albert	876	Jack Pine			
H. R. Knudson	Dahlton	1630	Spruce			32,401
Warren Shaw	Perigord	1905	"		73,750	
Andrew Nugent	Steep Creek	1903a	"	20,884	8,750	14,686
J. B. Albert	Prince Albert	2059	"			
Chas. Shaw, sr.		2049	"		52,235	
F. L. Smyth	Avebury	2028	"		2,000	14,005
R. J. Schwartz	Shell Lake	2089	"		2,000	33,410
H. M. Egelund	Canwood	2130	"			
Joseph Otte	Shellbrook	2157	"			
J. S. Spitza	Fort Pitt	2198	"	92,716	131,771	
W. N. Asselstine	Moose Range	2174	"		88,590	42,506
Andrew Jacobsen	Midnight Lake	2213	"	32,399	64,813	7,098
Wm. Nichol	Perigord	2217	"	107,499	182,719	19,350
A. G. Cook	Norbury	2242	"	15,000	15,000	
Peter Eidsvig	Lea Park	2259	"		12,600	38,600
Theo. Nadon	St. Walburg	2260	"	65,000	65,000	
McKenzie Ellis Wood Co.	Prince Albert	859	Jack Pine & Poplar			
" "	"	875	"			
" "	"	877	"			
" "	"	941	"			
Leonard Hodgson	Blaine Lake	2268	Spruce		28,558	
Chas. Shaw	Bjorkdale	2251	"	165,040	74,089	151,540
Hornseth & Jocklin	Ravine Bank	2257	"	17,760	112,297	62,565
D. McRae	Rabbitt Lake	2226	"	53,000	69,650	16,609
J. B. Albert	Prince Albert	2271	"			
Chas. Cornerford	Mullingor	2241	"	160,254	188,177	1,382
Hans Monsebraten	Canwood	2339	"			
A. H. Cunningham	Ravine Bank	2366	Spruce	60,000	10,900	49,100
Prince Albert Lumber Co.	Prince Albert	Permit 200931	"			
Ladder Lake Lumber Co.	Big River	Permit 200994	"			
John Vald	Prince Albert	2395	Jack Pine			
Med Foucher	Arborfield	2408	Spruce			
A. L. Brown	St. Walberg	2409	"	65,000	30,500	34,500
A. L. Brown	St. Walberg	2202	"	40,000	50,594	Nil.
Totals				894,546	1,263,993	517,752

the Prince Albert Agency, under Government Permits, for the fiscal year ending 31, 1917.

Log Count.			Cordwood.			No. of Returns made.	Date of Last Returns	Remarks.
Logs Cut.	Logs Manufactured	Logs on Hand.	Manufactured	Sold.	On Hand.			
.....	.....	1,200	.....	41	8	4	March 31, 1917	
.....	.....	.....	.....	.....	.....	3	Dec. 31, 1916	
.....	.....	.....	.....	.....	.....	2	Sept. 30, 1916	
.....	457	390	.....	.....	.....	4	March 31, 1917	
.....	.....	300	.....	.....	.....	4	" 31, 1917	
.....	.....	.....	.....	.....	.....	2	Sept. 30, 1916	
.....	.....	950	.....	.....	.....	4	March 31, 1917	
.....	.....	618	.....	.....	.....	3	Dec. 31, 1916	
.....	.....	1,000	.....	.....	.....	4	March 31, 1917	
.....	.....	20	.....	.....	32	.....	Sept. 30, 1915	37,000 shingles.
.....	1,832	.....	.....	.....	.....	3	Dec. 31, 1916	
.....	.....	.....	.....	.....	.....	3	" 31, 1916	
.....	793	1,212	.....	.....	.....	3	" 31, 1916	
4,251	3,652	1,630	.....	.....	.....	4	March 31, 1917	
.....	235	75	.....	.....	.....	4	" 31, 1917	
250	.....	250	.....	.....	.....	3	Dec. 31, 1916	
650	650	.....	.....	.....	.....	4	March 31, 1917	
.....	.....	.....	6,804	9,932	.....	4	" 31, 1917	
.....	.....	.....	354	354	.....	4	" 31, 1917	2,000 posts mfg. 2,700 sold, nil on hand.
750	750	.....	294	294	.....	4	" 31, 1917	3,337 Ry. Ties mfg. Nil on hand.
.....	.....	.....	.....	.....	.....	3	Jan. 13, 1917	
.....	.....	.....	.....	.....	.....	4	March 31, 1917	
2,850	3,107	.....	.....	.....	.....	4	" 31, 1917	
971	363	608	.....	.....	.....	3	Dec. 31, 1916	
2,510	700	2,510	.....	.....	.....	3	" 31, 1916	
.....	.....	1,191	.....	.....	.....	4	March 31, 1917	
1,359	2,340	264	.....	.....	.....	4	" 31, 1917	
.....	.....	.....	125	85	40	2	" 31, 1917	
958	958	.....	.....	.....	.....	1	Mar. 31, 1917	
1,758	.....	1,758	.....	.....	.....	1	" 31, 1917	
3,015	.....	3,015	.....	.....	.....	1	" 31, 1917	
.....	.....	.....	100	100	.....	1	" 31, 1917	
821	.....	821	.....	.....	.....	1	" 31, 1917	
1,600	1,600	.....	.....	.....	.....	1	" 31, 1917	
1,200	1,200	.....	.....	.....	.....	1	June 30, 1916	
22,943	18,637	17,812	7,677	10,765	80			

SCHEDULE D.—General Office Return of the Crown Timber Agency, Prince Albert, for fiscal year ending March 31, 1917.

Particulars.	Number &c.	As Compared with Previous Year.	As Compared with Previous Year.
		Increase.	Decrease.
Letters received	28,082		5,969
Letters written	31,060		4,829
Permits subject to dues issued	165	43	
Free permits issued	396		113
Seizures made	28		
Mill returns received and verified	174	2	
Mills operating under Government license	11	5	
" " Government permits	30		4
Quantity of lumber manufactured, under license	103.900,989	31,343,661	
" " sold, "	104,877,540	17,016,362	
" " on hand, "	33,389,584	8,081,727	
Hay permits issued	337		26

REPORT OF CROWN TIMBER AGENT, WINNIPEG.

Schedule A, showing receipts from timber, grazing and hay on Dominion lands.

Schedule B, showing saw-mills operating under license, and the extent of such operations.

Schedule C, showing the mills, including portable mills operating under permits, and the extent of such operations.

Schedule G, General office return.

In addition to the figures and information furnished in the above, the following statement shows the quantity of timber authorized under permits issued to settlers and others on Dominion lands:—

Quantity Authorized—	
Number of free permits issued to settlers and others	807
Lumber feet B.M.	1,985,446
Building logs (lineal feet)	260,375
Roof poles	28,815
Fence rails	99,225
" posts	76,610
Cords of wood	11,647
Lineal feet of piling	50,000
Railway ties (Hudson's Bay Construction Co.)	280,000
Settlers' permits and others on which dues were paid	713
Quantity Authorized—	
Lumber feet B.M.	893,085
Building logs (lineal feet)	3,180
Roof poles	2,660
Fence rails	250
" posts	15,845
Cords of wood	24,685
Shingles	10,000
Piling (lineal feet)	31,600
Railway ties	100,150
Telegraph and telephone poles	15
Pulpwood (cords)	224

Cordwood Berths.

Number of permits issued on cordwood berths	70
Authorizing the cutting of the following quantity of timber, viz:—	
Fence posts	55,850
Cords of wood	12,050
Telephone and telegraph poles	7,000

Permit Berths.

Number of permits issued on Permit Berths	69
Authorizing the holders thereof to cut—	
Feet B.M. lumber	1,140,000
Fence rails	500
" posts	4,600
Cords of wood	41,160
Piling (lineal feet)	2,500

License Berths.

Number of permits issued on License Berths	1
Authorizing the cutting of—	
Fence posts	1,500
Cords of wood	500
Total number of permits issued during year	1,660

Seizures.

During the year 72 seizures were made, covering timber cut on Dominion lands as follows—

Number of feet B.M. lumber covered	5,613,198
Lineal feet of logs	5,031
Fence rails	200
" posts	29,619
Roof poles	648
Cords of wood	2,171½
Telegraph poles	208
Lineal feet piling	2,954
Railway ties	35,716

Hay Permits.

Number of hay permits issued on Dominion lands during the year	896
Number of tons of hay covered thereby	12,672½

A. F. CROWE,
Crown Timber Agent.

SCHEDULE A.—Statement of Receipts from Crown Timber Agency at Winnipeg, for fiscal year ending March 31, 1917.

Month.	Ground Rent Under License.	Royalty Dues Under License.	Permit Fees, Dues and Rental.	Seizures.	Total Timber.	Hay Permits, Fees and Dues.	Firegarding Fees.	Registration Fees.	Total.
1916.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April	2,809 80	1,337 23	1,460 60	804 61	6,412 24	.....	....	.....	6,412 24
May	685 55	131 09	2,661 87	542 61	4,021 12	956 15	14 20	2 00	4,993 47
June	1,795 19	1,665 83	1,769 60	4,104 26	9,334 88	405 05	138 08	.....	9,878 01
July	918 62	1,517 60	1,067 16	2,332 24	5,835 62	514 30	63 32	12 00	6,425 24
August	174 19	2,726 15	1,073 16	2,418 26	6,391 76	60 10	79 90	2 00	6,533 76
September	270 64	2,484 30	1,497 57	97 10	4,349 61	5 00	30 18	....	4,384 79
October	399 70	4,720 68	3,456 27	10 00	8,586 65	6 30	17 28	....	8,610 23
November	48 72	20 89	1,340 74	19 00	1,429 35	.....	.....	...	1,429 35
December	161 89	1,503 85	3,568 36	323 24	5,557 34	50	5 76	4 00	5,567 60
1917.									
January	.....	1,538 04	2,337 64	7 00	3,882 68	.....	....	2 70	3,885 38
February	.....	28 59	2,351 79	8 00	2,388 38	.....	16 63	2 30	2,407 31
March	.....	1,326 17	1,916 73	359 73	3,602 63	2 00	2 43	6 00	3,613 06
Totals	7,264 30	19,000 42	24,501 49	11,026 05	61,792 26	1,949 40	367 78	31 00	64,140 44
Collected at Head Office.									
1916.									
April	.....	.....	.....	.....	.....	.....	.....	.....	.....
May	123 80	.....	8 45	.....	132 25	.....	.....	.....	132 25
June	.....	.....	.....	.....	.....	.....	.....	.....	.....
July	25 00	.....	.....	.....	25 00	.....	.....	.....	25 00
August	.....	.....	.....	.....	.....	.....	.....	.....	.....
September	.....	.....	.....	.....	.....	.....	.....	.....	.....
October	.....	.....	.....	.....	.....	.....	.....	.....	.....
November	.....	.....	.....	.....	.....	1 00	.....	.....	1 00
December	.....	.....	.....	.....	.....	.....	.....	.....	.....
1917.									
January	30 10	.....	.....	.....	30 10	.....	.....	.....	30 10
February	.....	.....	.....	140 81	140 81	.....	.....	.....	140 81
March	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals	178 90	.....	8 45	140 81	328 16	1 00	.....	.....	329 16
Grand totals	7,443 20	19,000 42	24,509 94	11,166 86	62,120 42	1,950 40	367 78	31 00	64,419 60

SCHEDULE B.—Showing the Saw-mills operating within the Winnipeg Agency, under Government License for the fiscal year ending March 31, 1917.

Number.	Mill-owner.	Location of Mill.	Berth No.	Kind of Power.	Horse Power.	Capacity per 10 hours.	Species of Timber Cut.	Lumber.		
								Manufactured.	Sold.	On Hand.
								Ft. B. M.	Ft. B. M.	Ft. B. M.
1	Brown & Ruthertord	No mill	1,928				Spruce and tamarack			
2	Bjoruson Halli	"	1,250				Spruce	28,200	28,200	
3	Burrows, I. A.	Grandview	575	Steam	450	125,000	Spruce and tan arack	[1]325,000	297,588	325,000
4	Caverly Bros	17 38 28 W. 1	1,790	"	50 to 60	20 to 25	Spruce	[1]268,025	1,623,328	49,055
5	Dutton, W. P.	Greenbush, Sask	1,713	"	250	50,000	Spruce and tamarack	118,779	1,073,301	
6	Frank & Shannon	Clements Pt	546	"	45	20,000	Spruce			
7	Gunn, John	Pt. du Bois	1,545	"	100	20,000	Spruce		102,227	40,173
8	McLellan Rogers & Milner	Ruby Lake	964	"	200	25,000	Spruce and tamarack			
9	McArthur, Peter	Graves Pt., Lake Winnipegosis	824	"	80	20,000	" "		1,181,956	438,608
10	McArthur, Peter		1,063	"	80	29,000	" "			9,885
11	McArthur, J. D	Lac du Bonnet (Ex. Blk. 4)	792	"	50	40,000	" "	992,603	1,265,547	649,757
12	McArthur, J. D	Lac du Bonnet	1,189	"	50	40,000	" "	1,150,348	924,838	785,542
13	National Trust Co., Ltd.	Birch River	986	"	150	45,000	Spruce, tamarack and poplar	7,453,652	5,532,274	2,493,837
14	National Trust Co., Ltd.	Fishtown Spur	992	"	60	25,000	" "	228,596	259,576	[2]
15	National Trust Co., Ltd.	Grandview	1,120	"	450	125,000	" "	1,060,600	4,297,550	
16	Red Deer Lumber Co.	Barrows	92	"	650	130,000	Spruce		2,632,371	
17	Red Deer Lumber Co.		823	"	650	130,000	"	10,855,134	4,259,767	9,048,578
18	Red Deer Lumber Co.		1,239	"	650	130,000	"	5,279,194	5,279,194	
19	Royal Bank of Canada	No mill	624				"			
20	Robinson, Wm.	Black River	869	Steam	100	35,000	Spruce, tamarack and poplar			
21	Ritchie, Wm	N.E. 31-44-27 W	2,229	"	50	10,000	Spruce and tamarack	10,000		10,000
22	Sparrow, W. H	Sec. 15-25-4 E.	1,685	"	60	15,000	" "	37,000	37,000	
23	Thornaldson & Simpson.	Sec. 20-23-4 E	1,887	"	45	15,000	" "	557,856	457,856	100,000
24	Williams, W. J. S	Fork River	944	"	25	7,000	Spruce and poplar		85,225	78,490
								31,364,987	29,337,798	14,028,925

[1] Correction. [2] The lumber manufactured from 5,650 less ft. of piling.

SCHEDULE B.—Showing the Saw-mills operating within the Winnipeg Agency, under Government License for the fiscal year ending March 31, 1917—*Concluded.*

Number.	Mill-owner.	Log Count.			Average per Log.	Railway Ties		Laths.			Number of Returns Made.	Date of Last Return.	Remarks.
		Logs Cut.	Logs Manufactured.	Logs on Hand.		Manufactured.	Sold.	Manufactured.	Sold.	On Hand.			
					Ft. B. M.								
1	Brown & Rutherford	29,177		29,177							4	31 Mar. '17	
2	Bjoruson, Halli	20	800		35						4	31 "	
3	Burrows, I. A	7,943	7,394	549	44						4	31 "	
4	Caverly Bros										4	31 "	
5	Dutton, W. P							375,200	395,950		2	30 Sept. '16	Transferred Prince Albert 22-11-16.
6	Frank & Shannon		3,000	[3]							4	31 Mar. '17	
7	Gunn, John						9,281				4	31 "	
8	McLellan Rogers & Milner			1,164						55,000	2	30 Sept. '16	" "
9	McArthur, Peter	8,557		10,557							4	31 Mar. '17	
10	McArthur, Peter			3,972							4	31 "	
11	McArthur, J. D		19,832 [4]5,000 [5]7,461	2,000	50			546,200	53,800	629,950	4	31 "	
12	McArthur, J. D	45,630	23,664	45,630	49			55,309	78,699		4	31 "	
13	National Trust Co., Ltd	145,078	187,793	133,249	39			3,687,250	2,642,550	1,115,042	4	31 "	
14	National Trust Co., Ltd										4	31 "	Operated by I. A. Burrows, Grandview.
15	National Trust Co., Ltd	75,580	81,212	75,580	50						4	31 "	
16	Red Deer Lumber Co										2	30 Sept. '16	Transferred Prince Albert 22-11-16.
17	Red Deer Lumber Co		176,804	61,601	51			4,838,000	1,420,350	4,247,950	2	30 "	"
18	Red Deer Lumber Co	37,786	56,528	37,786	93			1,000,855	1,000,855		4	31 Mar. '17	
19	Royal Bank of Canada					4,935	4,935				4	31 "	
20	Robinson, Wm	6,188		6,188							4	31 "	
21	Ritchie, Wm	2,100	200	1,900	50						2	31 "	
22	Sparrow, W. H		1,000		37						4	31 "	
23	Thornaldson & Simpson	19,700	15,496	19,700	36						4	31 "	
24	Williams, W. J. S										4	31 "	
		377,759	586,184	429,053		4,935	14,216	10,502,814	5,592,204	6,047,942			

[3]These logs destroyed by fire written off A. O. letter 9-8-16. [4]Destroyed by fire, written off. [5]Lost from boom, written off.

SCHEDULE C.—Showing the Mills (including the Portable Mills) operating wthin the Winnipeg Agency, under Government Permits, for the fiscal year ending March 31, 1917.

Number.	Mill Owner.	Location of Mill.	Berth Number.	Species of Timber Cut.	Lumber.			Log Count.			Average per log Ft. B.M.	No. of Returns made.	Date of Last Return.	Remarks.
					Manufactured.	Sold.	On Hand.	Logs Cut.	Logs Manufactured.	Logs on Hand				
					Ft. B.M.	Ft. B.M.	Ft. B.M.							
1	Audreczuk, Mike	5 34 23 W.	2304	Spruce	94,086	51,244	42,842	1,942	1,942	...	48	4	31 Mar. '17	
2	Acres, Fred	N.W. 15 7 11 E.	2383	"	32,700	16,000	17,700	1,150	1,150	.....	29	1	31 " '17	
3	Boily, P. E.	N.W. 31 6 11 E.	2181	Spruce, tamarack, and jack pine.	38,615	99,728	.....	1,220	1,220	.....	31	4	31 " '17	Cancelled.
4	Butson, W. F.	N.E. 34 30 25 W.	2245	"	166,055	55,813	110,242	3,946	3,946	...	42	4	31 " '17	"
5	Boushillier, Theophile	N.E. 22 19 7 E.	2338	Spruce	.....	.....	.....	1,214	.....	1,214	....	1	31 " '17	
6	Cote, David J. E.	S.W. 3 6 10 E.	2298	Tamarack and spruce	59,846	59,846	.....	1,620	1,620	.....	36	4	31 " '17	
7	Danard, R. R	N.W. 31 36 23 W.	2387	Spruce and tamarack	15,000	.....	15,000	1,030	375	655	40	1	31 " '17	
8	Danard, R. R.	S.E. 36 36 26 W.	2185	" "	85,406	60,380	86,752	.....	1,741	.....	49	4	31 " '17	"
9	Hunter, James D	Fishers' Siding.	2253	Spruce	31,470	29,970	1,500	648	467	662	67	4	31 " '17	"
10	Herron, Henry	S.W. 3 41 25 W.	2302	Spruce and tamarack	125,000	.....	125,000	3,522	1,663	1,859	75	4	31 " '17	
11	Hanson, Michael	19 38 28 W.	2349	" "	.....	.....	.....	4,406	.....	4,406	....	2	31 " '17	
12	Herron, Henry	N.W. 3 41 25 W.	2133	" "	.....	168,671	.....	.....	.....	.....	....	1	30 June, '16	"
13	Hawkins, John A	9 35 27 W.	2002	" "	.....	139,540	.....	.....	.....	.....	....	1	30 Sept. '16	"
14	Heale, Walter G	S.E. 21 16 2 E.	2362	Spruce	12,170	.....	12,170	4,300	300	4,000	40	2	31 Mar. '17	
15	Jefferson, W. D	N.W. 16 23 1 E.	2234	"	114,000	46,000	68,000	3,332	3,201	131	35	4	31 " '17	
16	Marshall, John R	17 23 11 W.	2359	Spruce and poplar	75,000	43,283	31,117	1,682	1,682	.....	44	2	31 " '17	
17	Matheson, H. W	31 26 5 W.	2200	Spruce and tamarack	.....	19,900	.....	.....	.....	.....	....	4	31 " '17	"
18	McNabb, W. A	16 38 27 W.	1931	Spruce	.....	96,400	.....	.....	.....	.....	...	2	30 Sept. '16	"
19	McClure, Albert E.	N.E. 11 25 3 W.	2171	Spruce, tamarack, jack pine.	.....	57,171	.....	.....	.....	.....	....	3	31 Dec. '16	"
20	Neault, Albert	N.E. 6 29 12 W.	2189	Spruce	5,000	21,289	7,357	461	100	361	50	4	31 Mar. '17	
21	Poucelet, Jos	N.E. 17 23 2 W.	2297	"	7,000	26,000	4,200	300	140	280	50	3	31 Dec. '16	
22	Parkinson. Wm	N.W. 34 39 25 W.	2348	Black poplar and spruce.	227,805	31,377	196,428	2,660	2,660	.....	85	2	31 Mar. '17	
23	Rushoy & Anderson.	Kilkenny	2193	Spruce	.....	40,113	.....	.....	.....	.....	....	3	31 Dec. '16	"
24	Sawicki, Mike	W. ½ 5 34 23 W.	2363	Spruce and tamarack	81,405	25,300	56,105	2,379	1,809	570	45	1	31 Mar. '17	
25	Sigurgeirson, W	28 22 1 E.	2215	Spruce	80,400	58,000	22,400	2,436	2,436	.....	33	4	31 " '17	"
26	Sigurdson, Sigurdur.	S.E. 28 22 1 E.	2240	"	.....	83,400	.....	.....	.....	.....	....	3	31 Dec. '16	"
27	Therrien, Honore	S.W. 3 8 9 E.	2388	Tamarack and spruce jack pine.	43,030	31,030	12,000	1,260	1,260	.....	34	1	31 Mar. '17	
					1,294,988	1,259,555	809,413	39,508	27,712	14,438				

SCHEDULE C.—Showing the Mills (including the portable Mills) operating within the Winnipeg Agency, under Government Permits, for the fiscal year ending March 31, 1917.

Number.	Mill-Owner.	Location of Mill.	Berth No.	Species of Timber Cut.	Lumber.			Log Count.			Average per Log.	No. of Returns Made.	Date of Last Return.	Remarks.
					Manufactured.	Sold.	On Hand.	Logs Cut.	Logs M'f'd.	Logs on Hand.				
	Permit Berths.				Ft. B.M	Ft. B.M.	Ft. B.M.				Ft. B.M.			
1	Caverly Jefferson	Porcupine	966	Spruce and tamarack	1,169,713	1,078,221	1,900,544	34,644	22,736	11,908	51	4	Mar. 31, 1917.	
2	Jefferson, W. D	N.W. 16-23 1 E.	899c	" "		78,000	100,634					4	" 31, 1917.	
3	McArthur, J. D	Lac du Bonnet	1944	" "	239,000	101,139	137,861		5,213		45	4	" 31, 1917.	
4	Serkan & Smith	Twin Island	1090	Spruce	61,988	31,216	30,772	1,437	2,028	295	30	4	" 31, 1917.	Operated by Bernardin & Dufault.
5	Finkelstein & Hagglund.	Sec. 25-26-3 W.	2230	Burned spruce	430,623	316,623	114,000	23,200	8,850	29,932	48	4	" 31, 1917.	
					1,901,324	1,605,199	2,283,811	59,281	38,827	42,135	...			

SESSIONAL PAPER No. 25

SCHEDULE D.—General Office Return of the Crown Timber Agency, Winnipeg, for fiscal year ending March 31, 1917.

Particulars.	Number, etc.	As Compared with Previous Year.	
		Increase.	Decrease.
Letters received	7,824	948	
Letters written	6,834		1,626
Permits subject to dues issued	853	392	
Free permits issued	807	74	
Seizures made	72	8	
Mill returns received and verified	180		61
Mills operating under government license	16		3
" " permits	30		3
Quantity of lumber manufactured, under license	31,364,987	9,060,000	
" sold, "	29,337,798		5,063,511
" on hand, "	14,028,925	2,024,007	
Hay permits issued	896	53	

REPORT OF CROWN TIMBER AGENT, KAMLOOPS.

Schedules A, B, C, D, and E, all of which are comparative statements completely covering the timber business done at this agency during the fiscal year ending March 31, 1917.

There is nothing further material to report regarding the lumbering within the Kamloops district since my last report for the year ending March 31, 1916. In the latter I stated that there was a good demand for timber cut by our mills at that time, also that an increased cut was anticipated. This situation still prevails, and while only one saw-mill has of late cut to any extent, on Dominion holdings within the Kamloops district during the past year, it is expected that at least one other additional saw-mill will operate extensively in the near future.

W. C. COWELL,
Agent.

SCHEDULE A.—Statement of Receipts from Crown Timber Agency at Kamloops, for fiscal year ending March 31, 1917.

Month.	Ground Rent under License.	Royalty Dues under License.	Permit Fees, Dues and Rental.	Seizures.	Total Timber.	Grazing Land Rental.	Hay Permits, Fees and Dues.	Fire-guarding Fees.	Registration Fees.	Total.
1916.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April	248 25	2,457 64	120 60		2,826 49	257 17			6 00	3,089 66
May	1,514 01	10 80	78 25		1,603 06	816 51	7 80	71 13	4 00	2,503 10
June			78 90		78 90	746 45	1 70			827 05
July	702 45	1,579 68	38 05		2,320 18	56 19				2,376 37
August			132 25		132 25	910 43	0 80		6 00	1,049 48
September	9 08	0 90	110 18	13 30	133 46	802 76			4 00	940 22
October		581 44	42 25		623 69	532 62			4 00	1,160 31
November		72 24	191 34		263 58	525 46				789 04
December	25 94		195 25		221 19	533 24			1 00	758 43
1917.										
January	16 10		193 65		1,348 65	413 56			8 00	1,770 21
February		1,138 90	169 15		202 45	394 64			4 00	601 09
March		33 30	1,215 62		1,215 62	927 96				2,143 58
Totals	2,515 83	5,874 90	2,565 49	13 30	10,969 52	6,916 99	10 30	71 13	40 00	18,008 54
Collected at Head Office.										
1916.										
April						32 56				32 56
May						71 21				71 21
June						1 80				1 80
July										
August										
September						264 31				264 31
October						4 36				4 36
November				26 85	26 85	15 90				42 75
December			37 50	130 00	167 50	53 20				220 70
1917.						42 49				42 49
January	1,932 73				1,932 73	2 55				1,935 28
February						160 98				160 98
March				77 00	77 00	21 53				98 53
Totals	1,932 73		37 50	233 85	2,204 08	670 89				2,874 97
Grand totals	4,448 56	5,874 90	2,602 99	247 15	13,173 60	7,587 88	10 30	71 73	40 00	20,883 51

SCHEDULE B.—Showing the Saw-mills operating within the Kamloops Agency under Government License, for the fiscal year ending March 31, 1917.

No.	Mill Owner.	Location of Mill.	Berth No.	Kind of Power.	Horse Power.	Capacity per 10 hours.	Species of Timber cut.	Lumber. Manufactured.	Log Count. Logs cut.	Shingle bolts. Manufactured.
								Ft. B.M.		Cords.
1	Okanagan Sawmills Ltd	Enderby	238				Fir Cedar	695,174	5,137	
			540	Steam	500	80 M.	White pine, Bull's pine.	151,115	1,339	
2	E. G. Wallinder	Kamloops	330	Portable			Fir, Yellow pine	20,000		
3	Adams River Lumber Co	Chase	482				Yellow and white pine.	9,393,191	93,665	
			437	Steam	800	150 M.	Bull pine, Fir, Cedar, Spruce Poplar.	164,925	2,134	
4	Columbia River Lumber Co	Malakwa	245	Shingle			Shingle bolts			109
	Totals							10,424,405	102,975	109

SCHEDULE C.—Showing the Mills (including the Portable Mills) operating within the Kamloops Agency, under Government Permits, for the fiscal year ending March 31, 1917. There are no mills operating under Government Permits within the Kamloops Agency.

SCHEDULE D.—General Office Return of the Crown Timber Agency, Kamloops, for fiscal year ending March 31, 1917.

Particulars.	Number, etc.	As compared with previous year. Increase.	As compared with previous year. Decrease.
Letters received	12,091	182	
Letters written	11,440	1,164	
Permits subject to dues issued	77	31	
Free permits issued	285		41
Seizures made	3		15
Mill returns received and verified	340	11	
Mills operating under government license	4	1	
" " " " permits			
Quantity of Lumber, manufactured under license	10,424,405	3,883	
" " sold " "			
" " on hand " "			
Hay permits issued	13	No change.	No change.

REPORT OF CROWN TIMBER AGENT, NEW WESTMINSTER.

Annual report of this agency for the fiscal year ended March 31, last, comprising schedule A, statement of receipts, $92,764.45, or $15,654.76 more than the amount collected in the preceding year, and which figures are exclusive of the amount collected at head office.

Schedule B, operations under license, shows the quantity of timber thus accounted for as:—

Saw logs	feet b.m.	67,431,496
Piling and poles	lineal ft.	33,892
Shingle bolts	cords.	39,999·31
Cordwood	"	817·83

A slight decrease in the quantity of sawlogs in comparison with the preceding year will be observed, which fact is explained by the weather conditions during the past winter. Shingle bolts, however, show a considerable increase. On lands under homestead entry the following quantity of timber was cut under permit:—

Sawlogs	feet b.m.	908,664
Shingle bolts	cords.	10,152·63
Piling and poles	lineal feet	12,380
Railway ties	pieces.	3,746
Cordwood	cords.	460

Timber accounted for under permits issued to the owners of lands sold, wherein the timber is reserved to the Crown:—

Sawlogs	feet b.m.	7,515,799
Shingle bolts	cords.	4,888
Piling and poles	lineal ft.	42,555
Railway ties	pieces.	1,314
Cordwood	cords.	300

Timber cut on vacant Dominion lands under permit:—

Sawlogs	feet b.m	4,407,030
Shingle bolts	cords.	3,506·47
Cordwood		70·5

Timber cut by the Western Canada Power Company, Limited, on flooded lands at Stave lake, under special arrangement with the department.:—

Sawlogs	feet b.m.	219,677
Shingle bolts	cords.	134

Timber cut without authority, and accounted for as under seizure:—

Sawlogs	feet b.m	293,897
Shingle bolts	cords.	570·05
Piling and poles	lineal feet.	6,900
Cordwood	cords.	94·5

SCHEDULE "D" shows that the general work of the office has been well maintained, all of which is respectfully submitted.

E. W. BECKETT,
Crown Timber Agent.

SCHEDULE A.—Statement of Receipts from Crown Timber Agency at New Westminster, for fiscal year ending March 31, 1917.

Month.	Bonus under License.	Ground Rent under License.	Royalty Dues under License.	Permit Fees, Dues and Rental.	Seizures	Total Timber.	Grazing Land Rental.	Total.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April		4,874 51	5,695 86	552 76	234 29	11,357 42		11,357 42
May		6,913 31	1,564 56	3,814 00	44 75	12,336 62		12,336 62
June	3,437 02	298 86	2,126 94	4,108 40	295 00	10,266 22		10,266 22
July		122 61	4,788 98	873 93	105 46	5,890 98		5,890 98
August		211 64	9,358 47	1,228 81		10,798 92	0 36	10,799 28
September	4,635 00		335 36	1,360 45	19 00	6,349 81		6,349 81
October		2 00	9,764 68	757 77	96 00	10,620 45		10,620 45
November		348 75	3,711 01	2,654 39	138 84	6,852 99		6,852 99
December	17 06	10 00	2,588 39	518 07		3,133 52		3,133 52
1917.								
January			7,984 76	147 75		8,132 51	0 36	8,132 87
February			1,065 67	2,315 97	136 50	3,518 14		3,518 14
March	18 87	224 96	3,027 82	132 10	102 40	3 506 15		3,506 15
Totals	8,107 95	13,006 64	52,012 50	18,464 40	1,172 24	92,763 73	0 72	92.764 45
Collected at head office:								
1916.								
April								
May								
June								
July								
August								
September								
October								
November								
December								
1917.								
January								
February								
March		3 80				3 80		3 80
Totals		3 80				3 80		3 80
Grand totals	8,107 95	13,010 44	52,012 50	18,464 40	1,172 24	92,767 52	0 72	92,768 25

SCHEDULE B.—Showing the Saw-mills operating within the New Westminster B.C., Agency under Government License, for the fiscal year ending March 31, 1917—*Concluded.*

Mill-Owner.	Log Count.			Average per Log.	Piling and Poles.			Shingle Bolts.			Number of Returns Made.	Date of Last Return.	Cordwood.		
	Logs Cut.	Logs Manufactured	Logs on Hand.		Manufactured.	Sold.	On Hand.	Manufactured.	Sold.	On Hand.			Cut.	Sold.	On hand.
				Ft. B.M.	Lineal feet.	Lineal feet.	Lineal feet.	Cords.	Cords.	Cords.					
Brunette Saw Mill Co., Ltd	1,205	824	381	819·8				361·5	361·5		12	Mar. 31, '17.			
Abbotsford Timber and Trading Co.	15,746	15,193	553	466·2	32,872	32,872		281·	256·	28	12	Mar. 31, '17.	30	15	15
Campbell River Lumber Co., Ltd.								1,822·5	1,947·25		4	Oct. 31, '16.			
M. B. King Lumber Co., Ltd.	18,838	18,838	600	656·6							4	Mar. 31, '17.	52·5	52·5	
Timberland Lumber Co., Ltd	19,855	19,255	1,300	673·8							4	Mar. 31, '17.			
Cheam Lumber Co.	3,948	4,248		573·1							4	Apr. 30, '17.			
Pacific Shingle Co., Ltd								3,600	2,780	829	8	Mar. 31, '17.	4 permits issued.		
Port Moody Shingle Co., Ltd.								2,852·83	2,579·83	273	8	"			
British Canadian Lbr. Corp								3,001·02	3,634·02	400	8	"			
Robt. McNair Shingle Co.	9,956	9,955	400	753·9				8,344·35	11,711·1	3,366·75	8	"			
Stoltze Manufacturing Co., Ltd								12,049·25	10,949·25	3,000	4	"			
Pitt River Shingle Co., Ltd								3,241·17	3,616·17	375	8	"			
British Empire Trust Co	4,509	4,509		747·7							4	"	70	70	
H. B. Sullivan					820	820					4	"			
U. Tamaki										18	4	"			20
B. Willson	2,836	2,836		782·6				280·5	280·5		8	"	12	12	
E. G. English and P. McCoy	105	105		1,293·6							4	"			
P. McCoy	4,402	4,402		992·8							4	"	117	117	
R. T. Smith and C. H. Zeigler.								269·99	329·99		4	"			
R. C. Morrison	813	613	200	848·6							4	"			
Jenkins Estate, Ltd	2,659	2,459	300	672·5				280·7	340·7	40	4	"			
R. V. Grosvenor and H. S. Reitlinger.	17,224	16,295	2,219	742·9				1,213·	1,213		24	"	351⅓	351⅓	
John Oliver					200	200					4	"			
G. S. Macgowan							1,625				4	"			
Vancouver Power Co., Ltd	46	46		261·4											
	102,142	99,578	5,853		33,892	33,892	1,625	37,612·81	39,999·31	8,329·75			832·83	817·83	35

SCHEDULE B.—Showing the Saw-mills operating within the New Westminster, B.C., Agency under Government License, for the fiscal year ending March 31, 1917.

Mill-Owner.	Location of Mill.	Berth No.	Kind of Power.	Horse-Power.	Capacity per 10 Hours.	Species of Timber Cut.	Lumber.		
							Manufactured.	Sold.	On Hand.
							Ft. B.M.	Ft. B.M.	Ft. B.M.
Brunette Saw Mill Co., Ltd	New Westminster.	33 (2), 452,511	Steam	500	100,000	Fir, cedar, hemlock, spruce.	675,498	675,498	
Abbotsford Timber and Trading Co.	Abbotsford	57, 81, 259	"	500		Fir, cedar, hemlock..	7,083,401	7,083,401	
Campbell River Lumber Co., Ltd.	White Rock	"B"	" and electric.	700	125,000	" "			
M. B. King Lumber Co., Ltd.	Newton, B.C.	"H"	"	225	50,000	" "	12,369,101	12,369,101	
Timberland Lumber Co., Ltd.	Craig, B.C.	"R"	Steam	175	45,000	" "	12,974,725	12,974,725	
Cheam Lumber Co	Rosedale	"A"	"	150	35,000	" "	2,434,400	2,434,400	
Pacific Shingle Co., Ltd	Port Coquitlam, B.C.	P.C. 286, 562	"	100	90,000	Cedar only			
Port Moody Shingle Co., Ltd.	Port Moody X	556 and 294	"	100	90,000	"			
British Canadian Lbr. Corporation.	Vancouver	36. 110	"	750	150,000	"			
Robt. McNair Shingle Co	Port Moody	38, 535	"	120	360,000	Fir, cedar, hemlock..	7,505,247	7,505,247	
Stoltze Manufacturing Co., Ltd.	Ruskin, B.C	106	"	120	360,000	Cedar only			
Pitt River Shingle Co., Ltd	Port Coquitlam.	99, 314	"	75	50,000	"			
British Empire Trust Co	No. mill	106					3,371,271	3,371,271	
H. B. Sullivan	"	170							
U. Tamaki	"	494							
B. Willson	"	361, 362					2,219,313	2,219,313	
E. G. English and P. McCoy	"	98					135,834	135,834	
P. McCoy	"	506					4,370,112	4,370,112	
R. T. Smith and C. H. Zeigler	"	400							
R. C. Morrison	"	338					520,172	520,172	
Jenkins Estate, Ltd	"	536					1,653,760	1,653,760	
R. V. Grosvenor & H. S. Reitlinger	"	"X," 96, 148, 150, 185, 268.					12,106,640	12,106,640	
John Oliver	"	334							
G. S. Macgowan	"	69							
Vancouver Power Co., Ltd	"	48					12,022	12,022	
							67,431,496	67,431,496	

SESSIONAL PAPER No. 25

SCHEDULE D.—General Office Return of the Crown Timber Agency, New Westminster, B.C., for the year ending March 31, 1917.

Particulars.	Number, etc.	As compared with previous year. Increase.	As compared with previous year. Decrease.
Letters received	2,891	6	
Letters written	5,157		164
Permits subject to dues issued	178		5
Free permits issued			
Seizures made	16		7
Mill returns received and verified	822	2	
Mills operating under Government license	12		2
" " Government permits			
Quantity of lumber manufactured under license	67,431,496		3,240,996
" " sold "	67,431,496		3,240,996
" of logs on hand " not scaled	5,853	2,564	
Hay permits issued			

REPORT OF CROWN TIMBER AGENT, REVELSTOKE.

This is the annual report of this agency for the fiscal year ended March 31, 1917, consisting of schedule A, statement of receipts, which shows the collections in this office as being $30,940.25, or an increase of $10,369.62 over the preceding year, to which please add the amount collected at head office. Schedule B gives the quantity of timber cut under license, being as follows:—

25,307,038 feet b.m. sawlogs.
1,890 cords of shingle bolts.
783,522 fence posts.
477 cords of cordwood.
22,780 lineal feet piling.
470 telephone poles.
2 cars waste filling.

which is a large increase over the preceding year.

In addition to the above the following timber was cut under the different headings enumerated hereunder:—

100,000 feet b.m. sawlogs.
30 cords of cordwood.

On lands held under homestead entry permits were issued to cut:—

263,000 feet b.m. sawlogs.
10,800 lineal feet building logs and piling.
100 fence rails.
114,000 fence posts.
2,822 cords of cordwood.
200 railway ties.
231 cords of shingle bolts.
1,000 roof poles.

Vacant Dominion lands permits were issued to cut:—

20,000 feet b.m. sawlogs.
3,200 lineal feet building logs and piling.
500 fence posts.
4 cords of shingle bolts.
23 cords of cordwood.
50 fence rails.

Schedule C, portable saw-mills operating under government permit.
Schedule D, general office return, showing comparison with previous year.
All of which is respectfully submitted.

T. J. WADMAN,
Crown Timber Agent.

SCHEDULE A.—Statement of Receipts from Crown Timber Agency at Revelstoke, for fiscal year ending March 31, 1917.

Month.	Bonus under License.	Ground Rent under License.	Royalty Dues under License.	Permit Fees, Dues and Rental.	Seizures.	Total Timber.	Grazing Land Rental.	Fire-guarding Fees.	Registration Fees.	Total.
1916.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April		361 34	1,669 65	2 00		2,032 99	5 20			2,036 19
May		1,568 50	3,267 29	4 25		4,840 04		42 30		4,882 34
June		154 10		47 00		201 10				201 10
July		237 75	4,248 92	8 75	10 50	4,505 92				4,505 92
August				7 75		7 75				7 75
September			1,414 63	120 44		1,535 07		3 05		1,538 12
October		8 00	5,588 88	1 25		5,598 13	3 20	166 48		5,767 81
November			575 38	5 75		581 13				581 13
December			5,166 77	4 00		5,470 77			31 00	5,501 77
1917.										
January			3,340 27	364 50		3,704 77				3,704 77
February				1 00		1 00				1 09
March	2,100 00	5 35		72 00		2,177 35				2,177 35
Totals	2,100 00	2,335 04	25,571 79	638 69	10 50	30,656 02	6 40	211 83	31 00	30,905 25
Collected at Head Office.										
1916.										
April		7 50				7 50				7 00
May		296 05				296 05				296 05
June										
July										
August										
September										
October										
November										
December										
1917.										
January		367 27				367 27				367 27
February										
March										
Totals		670 82				670 82				670 82
Grand totals	2,100 00	3,005 86	25,571 79	638 69	10 50	31,326 84	6 40	211 83	31 00	31,576 07

SCHEDULE B.—Showing the Saw-mills operating within the Revelstoke Agency, under Government License, for the fiscal year ending March 31, 1917.

No.	Mill Owner.	Location of Mill.	Berth No.	Kind of Power.	Horse Power.	Capacity per 10 Hours.	Species of Timber Cut.	Lumber Manufactured.	Logs Cut.	Average per Log.	Fence Posts.	Lin. Ft. Piling.	Telegraph Poles.	Cords, Cordwood.	Shingles.			Number of Returns Made.	Date of Last Return.
															Manufactured.	Sold.	On Hand.		
								Ft. B.M.		Ft. B.M.									
1	Columbia River Lumber Co...	Golden, B.C.	15	Electric	1,200	200 M.	Spruce, Fir, Larch, Cedar & Jack Pine.	22,749,819	247,860	91·75	.....	.....	.....	.....	.....	.....	.....	4	Mar. 31, '17
2	G. B. Ferguson & Co.....	Anzac, B.C.	116	Steam..	200	50 M.	Spruce, Fir, White Pine, Hemlock & Cedar	2,557,219	19,940	128·25	....	.....	.....	...	.....	.....	.. .	4	Mar. 31, '17
3	Forest Mills of B.C., Ltd....	No mill....	113	.....	.....	.....	Cedar	....	....	.....	.....	....	....	...	1,890	Cords		4	Mar. 31, '17
4	Forest Mills of B.C., Ltd....	"	127	.....	.....	.....	Cedar	25,307,038	.....	.....	783,522	22,780	470	477	Shingle 2 Cars	Waste	Bolts. Filling.	4	Mar. 31, '17

SCHEDULE C.—Showing the Mills (including the Portable Mills) operating within the Revelstoke Agency, under Government Permits, for the fiscal year ending March 31, 1917.

SCHEDULE D.—General Office Return of the Crown Timber Agency, Revelstoke, for fiscal year ending March 31, 1917.

Particulars, etc.	Number, etc.	As compared with previous year. Increase.	As compared with previous year. Decrease.
Letters received	Included in Land	Office Return.	
Letters written	" "	" "	
Permits subject to dues issued	21	15	
Free permits issued	90	30	
Seizures made			4
Mill returns received and verified	303		5
Mill operating under Government license	2	1	
" " " Government permits			
Quantity of lumber manufactured under license	25,307,038	4,230,385	
" " sold " "			
" " on hand " "			
Hay permits issued			

REPORT OF THE CHIEF INSPECTOR OF CROWN TIMBER OFFICES.

I beg to submit the annual report of my office for the year ended March 31, 1917, appended to which are the following statements, namely:—

A.—Business transacted at the several Crown Timber offices and amount of revenue collected.

B.—Amount of lumber and other products of timber cut and disposed of by licensees and holders of permit berths.

C.—Amount of timber covered by permits issued to actual settlers.

D.—Number of hay permits issued on Dominion School and Forestry lands, and tons of hay covered thereby, and amount of revenue collected thereon.

The year's business shows a satisfactory increase in revenue over that of the previous year, as will be seen from the figures given in statement A.

The output of lumber at the mills, manufacturing wholly from Dominion timber, during the year, was 309,880,991 feet b.m., an excess amount of upwards of 50,000,000 feet over the previous year.

The demand for lumber supplies throughout the farming districts in the West is active, notwithstanding the great advance in price, due to well known causes.

The supply, apart from the manufacture within the Prairie provinces, comes principally from British Columbia, and the lake of the Woods and Rainy Lake districts in Western Ontario. Practically no lumber is being imported, at the present time, from the United States.

In the round of my inspection of the offices, during the year, I found an increased interest being taken by the officials, in carrying on the timber work, and an improvement in the service having taken place.

Collection of revenue is being kept up closely, and practically no loss occurred.

Notwithstanding the activity shown by the timber inspectors in prosecuting their duties, considerable trespassing took place, as indicated from the figures given hereunder of seizures:—

16,435,025 feet b.m. of lumber.
350,461 lineal feet of round timber.
49,950 railway ties.
473,013 lineal feet of mining timber.
18,715 cords of wood.
570 cords of shingle bolts.

The system of yearly audit of the camp and mill books of mill operators is being carried forward promptly by my assistant, Mr. H. W. Clarke, who continues to render most valuable service to my office.

E. F. STEPHENSON,
Chief Inspector, C. T. Agencies.

STATEMENT A.—Summary of work performed and revenue collected at the respective Crown Timber Offices, during the year ended March 31, 1917.

Agency.	Timber and Grazing.								Forestry.				School Lands.					Revenue.
	Bonus.	Ground Rent.	Royalty on Sales.	Timber Permits issued.	Timber Seizures.	Hay Permits.	Grazing Rentals.	Sundries.	Permit Dues and Rentals.	Seizures.	Grazing Rentals.	Hay Permits.	Timber Permits.	Hay Permits.	Grazing Permits.	Seizures.	Sundries.	
																		$ cts.
Battleford				250		301	259	89	261	1	83	26	1	510	165	1		6,376 60
Calgary		33	46	221	25	25	327	7	118	4	41	15	1	579	469			43,892 68
Dauphin				252	25	283	44		1,067	84	29	207	4	250	37	5	1	12,885 14
Edmonton		51	63	1,187	74	618	110	618	60	4	33	33	16	527	187		92	94,140 92
Grande Prairie				440	2	206	35	39					39	38				2,384 74
High Prairie				42		31	6	23						4	7			343 32
Humboldt				69	6	170	55	7					6	421	258	1	15	3,864 45
Kamloops		52	51	377	2	11	435	27	39		9	6						18,308 18
Lethbridge				74		2	248	3	120	4	60	12	1	45	124			7,982 07
Maple Creek				89		232	1,374	8	185	1		58		465	194		9	21,639 42
Medicine Hat				13		146	973	8	135	3		30		113	174			26,109 06
Moosejaw				8	3	37	504		293	15	117	60	3	750	1,167			12,222 09
New Westminster	6	184	162	178	16		2											92,764 45
Peace River				420	5	135	38							19	20			2,160 59
Prince Albert		14	33	561	44	337	154	4	134	12	17	86	18	330	79			71,815 89
Red Deer				130	9	77	149	1	32		3		8	383	268			6,619 46
Revelstoke	1	73	25	111	1		2	5										30,940 25
Saskatoon				38		72	78	1	64		17	14		532	180		7	4,446 21
Swift Current				10		77	346	2			26	22		394	307		6	10,837 04
The Pas				3														26 25
Yorkton				54	3	92	13		121	6	14	69		272	73			3,033 31
Weyburn				3		86	104	1	1	2	16	26	3	385	104			3,008 45
Winnipeg		109	69	1,660	80	896		44	190	1	102	52	80	713		5	6	69,232 84
Total	7	516	419	6,196	295	3,834	5,254	887	3,120	137	567	716	181	6,733	3,813	12	136	545,033 41
Previous Year	13	563	358	6,335	255	4,091	4,273	806	3,202	133	502	865	98	7,320	3,012		107	512,640 90

N.B.—Revenue, exclusive of payments made to the department on account of the respective agencies.

STATEMENT B.—Showing Manufacture and Sale of Timber Products cut by holders of ended

Agency.	Lumber Ft. B.M.			Lath.		
	Manufactured.	Marketed.	On hand.	Manufactured.	Sold.	On Hand.
Calgary	13,005,409	17,141,651	8,336,516	1,002,300	908,550	69,700
Edmonton	25,755,283	31,672,051	4,764,655	4,070,450	4,851,480	355,250
Kamloops	10,424,405	10,424,405	4,632,761	Not known.	Not known.	Not known.
New Westminster	67,431,496	67,431,496	21,324,158	" "	" "	" "
Prince Albert	103,900,989	104,877,540	33,389,584	31,078,200	31,083,650	12,270,300
Revelstoke	25,307,038	25,307,038	5,321,442	Not known	Not known.	Not known.
Winnipeg	31,364,987	29,337,798	14,028,925	10,502,814	5,592,204	6,047,942
Total	277,189,607	286,191,979	91,798,041	46,653,764	42,435,884	18,743,192
Timber cut under permit for commercial						
Calgary	2,481,875	3,088,435	534,132			
Edmonton	6,807,702	6,791,589	5,200,029			
Kamloops	7,129,767	7,129,767	Not known.			
New Westminster	13,051,170	13,051,170	" "			
Prince Albert	894,546	1,263,993	517,752			
Revelstoke	425,000	425,000	Not known.			
Winnipeg	1,901,324	1,605,199	2,283,811	71,410		71,410
Total	32,691,384	33,355,153	8,535,724	71,410		71,410
Grand total	309,880,991	319,547,132	100,333,765	46,725,174	42,435,884	18,814,602
Year 1915-1916	248,423,811	300,327,294	33,144,867	33,144,867	30,801,180	19,593,147

SESSIONAL PAPER No. 25

Timber Berths on Dominion Lands cut under yearly License during the fiscal year March 31, 1917.

Railway Ties.	Shingles.		Piling and Mining props.	Saw Logs.			Fence posts.
	Manufactured.	Bolts.	Sold.	Pcs. cut.	Manufactured.	On Hand.	
	Sold.	Cords.	Lin. Ft.				
49,950	.....	.....	.....	258,536	276,550	393,807	.....
117,315	22,000	.....	5,268	316,053	433,214	292,950	.....
.....	.....	109	.....	102,975	102,975	.....	.....
.....	.....	39,999	33,892	102,142	99,578	5,853	.....
98,896	.....	.....	.....	1,728,429	1,858,077	2,038,857	.....
.....	.....	1,890	23,250	267,900	267,900	.....	783,522
14,216	.....	.....	.....	377,759	586,184	429,053	.....
280,378	22,000	41,998	62,410	3,153,794	3,624,478	3,160,520	783,522

purposes during same period.

.....	.....	.....	.....	166,094	171,628	69,627	.....
761	879,000	.....	.....	130,567	105,186	88,800	.....
20,610	.....	1,277	.....	Not known.	Not known.	.....	265,302
5,060	.....	18,681	54,935	" "	" "	.....	.....
.....	.....	.....	.....	22,943	18,637	17,812	.....
200	.....	235	.....	Not known.	Not known.	.....	114,500
.....	.....	.....	.....	59,281	38,827	42,135	.....
26,631	879,000	20,193	54,935	378,885	334,278	218,374	379,802
307,009	901,000	62,191	117,345	3,532,679	3,958,756	3,378,894	1,163,324
1,289,945	.....	.....	739,578	3,017,030	3,311,080	.....	.....

STATEMENT C.—Timber Material covered by Permits issued at the respective Agencies, principally to Homestead Settlers, during the year ended March 31, 1917.

Agency.	Lumber and Logs.	Fence Rails.	Roof Poles.	Fence Posts.	Cords Cordwood.	Railway Ties.	Telegraph and Telephone Poles.	Round Timber.	Cords Shingle Bolts.
	Ft. B.M.							Lin. Ft.	
Battleford	1,332,742	66,690	16,315	39,105	3,083				
Calgary	1,534,945	61,375	8,679	137,200	4,940	20,000		6,213,208	
Dauphin	3,979,212	3,949	1,450	56,895	13,250				
Edmonton	6,960,990	1,107,648	210,381	251,220	5,667	715,393		1,340,725	
Grande Prairie	1,687,375	537,571	103,661	120,356	1,411				
High Prairie	578,737	58,400	11,380	14,700	618				
Humboldt	272,281	4,300	800	8,570	69				
Kamloops	7,129,767	38,360	7,735	265,302	7,858	20,610	4,992	36,219	1,277
Lethbridge	109,248	13,455	4,660	12,075	1,882			104,468	
Maple Creek	340,305	96,336	23,580	170,165	2,576				
Medicine Hat	151,155	31,946		16,575	720				
Moosejaw	13,746	375	500	7,334	1,967		2		
New Westm't'r	13,051,170				831	5,060		54,935	15,174
Peace River	3,907,496	589,120	197,034	120,792	1,475				
Prince Albert	7,937,568	1,268,382	67,353	131,519	32,042			5,736,940	11
Red Deer	139,520	10,370	1,308	49,861	1,204		300	39,000	
Revelstoke	425,000	150	1,000	114,500	2,875	200			235
Saskatoon	49,200	2,200	1,490	12,500	763				
Swift Current		500	335	900	39				
The Pas	5,400				30				
Yorkton	925,227	11,750	200	10,150	991		26		
Weyburn			625	1,400	44				
Winnipeg	8,962,096	99,985	31,475	153,755	97,886	380,450	7,015	91,350	10,000 Shingles
Total	59,493,180	4,002,856	689,961	1,694,874	182,221	1,141,713	12,335	13,666,845	26,697
Previous Year	61,193,009	4,266,175	1,081,602	1,594,450	153,102	904,902	10,628	Pcs.526,234	12,616

E. F. STEPHENSON,
Inspector.

SESSIONAL PAPER No. 25

STATEMENT D.—Showing the number of Hay Permits issued at the several Crown Timber Offices and the amount of hay covered thereby for the year ended March 31, 1917.

Agency.	Dominion Lands.		School Lands.		Forestry Lands.		Revenue.
	Number of Permits Issued.	Tons of Hay.	Number of Permits Issued.	Tons of Hay.	Number of Permits Issued.	Tons of Hay.	
							$ cts.
Battleford	301	5,576	510	7,408	26	590	1,879 60
Calgary	25	456	554	13,572	13	340	1,343 60
Dauphin	282	4,703	241	5,045	199	3,416	1,477 53
Edmonton	618	5,715	525	5,335	31	1,138	1,981 26
Grande Prairie	206	3,942	39	578	—	—	541 60
High Prairie	31	513	4	80	—	—	84 80
Humboldt	170	2,098	424	8,324	—	—	1,042 15
Kamloops	11	198	—	—	6	112	23 00
Lethbridge	2	160	44	449	12	221	71 90
Maple Creek	232	6,531	446	7,999	58	1,795	1,025 00
Medicine Hat	146	5,090	113	979	30	2,795	369 50
Moosejaw	37	491	750	11,179	60	2,094	1,945 55
New Westminster	—	—	—	—	—	—	—
Peace River	135	1,500	19	227	—	—	272 90
Prince Albert	337	3,395	330	3,704	4	107	1,437 80
Red Deer	78	3,838	381	11,180	3	164	1,215 87
Revelstoke	—	—	—	—	—	—	—
Saskatoon	72	1,465	532	9,980	14	197	1,639 75
Swift Current	77	1,151	394	5,027	22	568	733 00
The Pas	—	—	—	—	—	—	—
Yorkton	92	1,476	272	2,590	69	3,067	956 60
Weyburn	86	1,811	385	6,350	26	523	1,118 30
Winnipeg	896	12,672	713	10,221	52	826	3,737 48
Total	3,834	62,689	6,676	108,227	625	17,953	22,897 19
Previous year	3,987	58,542	7,316	101,753	798	17,632	23,180 48

E. F. STEPHENSON,
Inspector.

REPORT OF INSPECTOR OF RANCHES, PRINCE ALBERT.

The number of applications for grazing leases has increased considerably in my district during the past year. As to the grazing conditions, the season has been very favourable, although there has been a shortage of hay for winter months, in some parts, owing to the abnormal rainfall during the past summer.

The number of inspections made were 236, the number of miles driven, 4,340, the number of miles travelled by rail, 3,133.

JNO. E. SINCLAIR,
Ranch Inspector.

REPORT OF THE INSPECTOR OF RANCHES, CALGARY.

I beg to report herewith that during the fiscal year which ended March 31, 1917, I travelled 12,483 miles by rail and 7,450 miles by wagon. In the course of the year 4,094 land inspections were made.

GEO. H. CLOAKEY,
Inspector of Ranches.

REPORT OF THE INSPECTOR OF RANCHES, MOOSEJAW.

This report covers only the period from April 1 to October 31, 1916. The period from November 1, 1916, to March 31, 1917, I was engaged in work for the Seed Grain Department.

The work done in connection with this office for the year ending March 31, 1916, is as follows:—

Number of inspections reported	170
" quarter-sections covered by reports	527
" quarter-sections recommended to be leased	401
" miles travelled by rail	7,781
" " " team	4,108
" letters received	806
" " written	298

G. H. LYDIARD,
Inspector of Ranches.

REPORT OF THE INSPECTOR OF RANCHES, MINNEDOSA.

I beg to submit my annual report, covering the transactions of my office, for the fiscal year ending March 31, 1917. All of the work was performed between April 1 and November 1, 1916.

I made 152 inspections, necessitating travelling 9,292 miles by rail, 2,395 miles by wagon, and 668 miles by boat, making a total mileage travelled of 12,355. In all, there were recommended for grazing purposes, 61,945 acres, and for other purposes, 37,265 acres. Applications received during the fiscal year were 153. At the present time there are 101 outstanding inspections.

From November 1, 1916, to March 31, 1917, I was engaged in seed-grain collections, under H. G. Cuttle, Chief Inspector of Dominion Land agencies, at Moosejaw, Sask., working out from the city of Moosejaw

H. L. BOWYER,
Inspector of Ranches.

SESSIONAL PAPER No. 25

REPORT OF INSPECTOR OF RANCHES, MAPLE CREEK.

Date.	How employed.	No. Special Investigations.	Miles travelled.		Days at Hdqts.	Days off Duty.	Total Amount Expenses.
			By Rail.	By Wagon.			$ cts.
April	No. ¼ Section inspected.	168		682	7		174 00
May		43	170	244	19		76 80
June		64	1,041	475	8		181 90
July		34	417	269	16	2	90 95
August		132	262	810	5		219 15
September		87	252	527	9		152 00
October		104	264	551	10		157 50
November		70	170	521	12		141 25
December		33	384	251	16		88 80
January			748	24	17		46 80
February					24		3 80
March		15	1,644	249	13		131 10
	By re-inspection of old leases	243					
		993	5,352	4,593	156	2	1,464 25

RUSSELL SEXSMITH,
Inspector.

REPORT OF THE SUPERINTENDING ACCOUNTANT.

Statements of revenue collected from various sources during the fiscal year ended March 31, 1917, as follows:—

A.—Dominion lands, including Yukon	$4,189,905 55
B.—Ordnance lands	5,553 26
C.—School lands	1,699,370 06
D.—Registration fees, Yukon	796 85
E.—Fines and forfeitures, N.W.T.	95 00
F.—Casual revenue	15,618 26
G.—Seed grain and relief repayments	3,652,729 05
H.—Fines under Immigration Act	2,089 72
I.—Chinese immigration revenue	140,487 00
J.—Sales of land, special account	407,125 71
	$10,113,770 46

A statement of revenue on account of Dominion lands (marked K) shows the receipts monthly, classified under subheads.

Statement (marked L) shows a comparison between the receipts on account of revenue of the previous twelve months.

GEO. D. POPE,
Acting Superintending Accountant.

A.—Dominion Lands Revenue (Cash and Scrip) for the fiscal year ended March 31, 1917.

Agencies.	Cash.	Scrip.	Total.
	$ cts.	$ cts.	$ cts.
Yukon Territory—			
Sales of land	1,249 55		1,249 55
Rentals of land	7,909 91		7,909 91
Map sales, office fees, etc	62 00		62 00
Timber dues	14,560 48		14,560 48
Hay permits	83 50		83 50
Mining fees	47,673 00		47,673 00
Export tax on gold	99,043 07		99,043 07
Free certificates for export of gold	38 00		38 00
Hydraulic leases	2,338 50		2,338 50
Dredging leases	1,317 91		1,317 91
Coal royalty and fees	40 00		40 00
Homestead fees	60 00		60 00
Interim receipt account	190 00		190 00
	174,565 92		174,565 92
Dominion Lands Agencies—			
Battleford	104,971 61		104,971 61
Brandon	1 00		1 00
Calgary	387,888 76		387,888 76
Dauphin	15,035 57		15,035 57
Edmonton	45,074 58		45,074 58
Estevan	136 07		136 07
Grande Prairie	13,939 84		13,939 84
High Prairie	1,499 25		1,499 25
Humboldt	8,028 05		8,028 05
Kamloops	11,014 77		11,014 77
Lethbridge	234,700 58		234,700 58
Maple Creek	443,036 70		443,036 70
Meadow Lake	70 00		70 00
Medicine Hat	260,899 26		260,899 26
Moosejaw	452,248 43		452,248 43
New Westminster	3,538 29		3,538 29
Peace River	7,697 52		7,697 52
Prince Albert	15,861 54		15,861 54
Red Deer	66,280 49		66,280 49
Regina	2,028 04		2,028 04
Revelstoke	3,054 47		3,054 47
Saskatoon	227,291 58		227,291 58
Swift Current	511,566 62		511,566 62
Weyburn	77,468 99		77,468 99
Winnipeg	34,005 43	332 61	34,338 04
Yorkton	6,839 80		6,839 80
	2,934,177 24	332 61	2,934,509 85
Crown Timber Agencies—			
Battleford	834 62		834 62
Calgary	32,667 08		32,667 08
Dauphin	10,790 26		10,790 26
Edmonton	93,446 02		93,446 02
Grande Prairie	879 50		879 50
High Prairie	167 82		167 82
Humboldt	103 81		103 81
Kamloops	13,680 41		13,680 41
Lethbridge	818 91		818 91
Maple Creek	244 20		244 20
Medicine Hat	213 02		213 02
Moosejaw	505 20		505 20
New Westminster	92,767 53		92,767 53
Peace River	1,589 80		1,589 80
The Pas	26 25		26 25
Prince Albert	70,363 37		70,363 37
Red Deer	1,015 10		1,015 10
Revelstoke	30,981 22		30,981 22
Saskatoon	109 50		109 50
Swift Current	3 00		3 00
Weyburn	8 25		8 25
Winnipeg	62,507 68		62,507 68
Yorkton	1,120 06		1,120 06
	414,842 61		414,842 61

A.—DOMINION LANDS REVENUE (Cash and Scrip) for the fiscal year ended March 31, 1917—*Continued.*

Agencies.	Cash.	Scrip.	Total.
	$ cts.	$ cts.	$ cts.
Miscellaneous—			
Rocky Mountains Park	40,290 93		40,290 93
Jasper Park	2,828 73		2,828 73
Yoho Park	385 36		385 36
Waterton Lakes Park	1,332 00		1,332 00
Elk Island Park	8 25		8 25
Buffalo Park	257 23		257 23
Glacier Park	542 25		542 25
Moose Mountain Buffalo Park	1 50		1 50
Antelope Park	205 20		205 20
Survey fees	6,638 68		6,638 68
Irrigation fees	629 00		629 00
Map sales, office fees, etc	11,436 56		11,436 56
Fees, Board of Examiners, D.L.S	560 00		560 00
Mining fees	10,234 25		10,234 25
Grazing lands	128,341 50		128,341 50
Grazing lands (improvements)	1,639 80		1,639 80
Hay permits	9,750 70		9,750 70
Coal lands	323,700 72		323,700 72
Dredging leases, N.W.T	222 95		222 95
Stone quarries	7,795 48		7,795 48
Rent of water power	600 00		600 00
Suspense account	3,890 34		3,890 34
Petroleum	92,242 37		92,242 37
Sand, stone and gravel	2,089 46		2,089 46
Forestry Branch—sale of trees, etc	3,135 22		3,135 22
Miscellaneous	272 31		272 31
Sales of land	1,467 46		1,467 46
Improvements	103 00		103 00
Homestead fees	10 00		10 00
Rentals	1,550 78		1,550 78
Irrigation sales	14,147 75		14,147 75
Sundry fees	10 00		10 00
	666,319 78		666,319 78
	4,189,905 55	332 61	4,190,238 16
Less Refunds	134,243 14		134,243 14
	4,055,662 41	332 61	4,055,995 02

B.—STATEMENT of Ordnance Lands Revenue for the fiscal year ended March 31, 1917.

1916.	
April	$ 270 40
May	557 70
June	340 95
July	1,004 40
August	329 74
September	929 95
October	15 00
November	1,160 31
December	102 68
1917.	
January	300 03
February	523 80
March	18 30
	$5,553 26

C.—STATEMENT OF RECEIPTS on Account of School Lands for the fiscal year ended March 31, 1917.

Month.	Manitoba School Lands.	Saskatchewan School Lands.	Alberta School Lands.	Total.
1916.	$ cts.	$ cts.	$ cts.	$ cts.
April	11,699 88	15,757 97	16,115 88	43,573 73
May	12,298 40	36,747 12	31,082 21	80,127 73
June	40,972 56	78,013 59	16,116 07	135,102 22
July	17,247 83	201,477 70	125,430 06	344,155 59
August	13,666 43	25,106 27	32,657 53	71,430 23
September	9,715 90	24,052 26	11,802 02	45,570 18
October	12,915 09	34,567 41	34,453 75	81,936 25
November	80,710 03	141,032 03	170,998 44	392,740 50
December	37,543 18	76,418 49	75,026 42	188,988 09
1917.				
January	23,491 54	48,627 32	57,550 88	129,669 74
February	8,018 82	39,991 29	35,827 67	83,837 78
March	16,317 01	43,797 18	42,123 83	102,238 02
	284,596 67	765,588 62	649,184 76	1,699,370 0

D.—STATEMENT of Registration Fees in the Yukon Territory for the fiscal year ended March 31, 1917.

Month.	District.	Registrar.	Amount.
			$ cts.
1916.			
April	Yukon	A. E. Lamb	79 75
May	"	"	90 00
June	"	"	125 25
July	"	"	72 50
August	"	"	80 60
September	"	"	70 75
October	"	"	95 25
November	"	"	50 75
December	"	"	22 00
1917.			
January	"	"	36 75
February	"	"	17 25
March	"	"	56 00
Total			796 85

E.—STATEMENT of Fines and Forfeitures in the Northwest Territories for the fiscal year ended March 31, 1917.

Month.	From Whom Received.	Amount.
		$ cts.
1916.		
November	Inpsector C. A. Rheault, J.P	25 00
"	Inspector C. A. Rheault, J.P	25 00
"	Commissioner of Northwest Territories	20 00
"	Thos. Wm. Harris, J.P	10 00
"	Lewis Conibear	15 00
		95 00

SESSIONAL PAPER No. 25

F.—Statement of Casual Revenue for the fiscal year ended March 31, 1917.

Name.	Particulars.	Amount.
		$ cts.
J. B. Walker	Being refund, by Mrs. Hopkins, on account of expenses incurred by Department on her behalf in March, 1914—Immigration Expenses	3 00
E. H. Roberts	Refund proceeds sale of a pony, the property of the Forestry Branch—Dominion Land sand Parks—Forestry	180 00
E. H. Roberts	Refund amount received for sale of oxen and horses, the property of Forestry Branch—Dominion Lands and Parks—Forestry	180 00
A. Ballantine	Refund to pay cost of fireguarding timber berth No. 1366, in seasons of 1912–1913—Dominion Lands and Parks—Forestry	63 54
Mrs. A. R. O'Regan	Being refund on account of repatriation expenses in December, 1914—Relief of Distressed Canadians	5 00
Local Council, Yukon	Refund balance unexpended grant in 1912–13, in connection with smallpox epidemic—Yukon Appropriation	1,479 47
J. H. Brownlee	Refund of amount overpaid for salary in 1914–15, viz.: 8 days in November, all December, 1914, 5 days in January, 25 days in February, 2 days in March, 1915—Expenses of Government Yukon Territory	755 35
Wm. H. Boyd	Being refund of balance due on account of Immigration expenses, 1912–13—Immigration Expenses	5 50
Canadian Pacific Railway Company	Being refund of railway fare for Alf. B. Rawlings, Toronto, to Buffalo on January 11, 1916—Immigration Expenses	3 10
Victor Belliard	Being refund balance on account transportation—Immigration Expenses	5 00
Chief Inspector Dominion Lands Agencies	Refund proceeds sale of old furniture in Dominion Lands Office, Brandon—Dominion Lands and Parks—Contingencies	49 50
H. G. Cuttle	Being refund amount received for desk sold; formerly the property of the Dominion Lands office at Brandon—Dominion Lands and Parks—Contingencies	10 00
G. L. Milne	Being refund by L. Ostler on account of repatriation expenses—Relief of Distressed Canadians	5 00
Wm. Vesey	Cheque No. 1071, $14.00; C. Johnston, Cheque No. 1072, $14.00; M. Doyle, Cheque No. 1074, $14.00; A. Clarke, Cheque No. 1075, $14.00; C. Wadell, Cheque No. 1130, $14.00. Refund of above cheques dated 29th September, 1910, to 30th September, 1910, not used—Dominion Lands and Parks—Protection of Timber	70 00
T. H. Beddome	Refund to adjust protection of timber—Dominion Lands and Parks—Protection of Timber	10 00
Canadian Pacific Railway Company	Being refund salaries paid inspectors at Rogers Pass tunnel in 1915–16—Dominion Lands and Parks	2,398 39
E. W. Hubbell	Refund balance unexpended during 1915–16—Dominion Lands and Parks—Surveys	209 71
Railway Passengers Assurance Co.	Refund overpayment on bond of surveys, paid through Astronomical Surveys—Scientific Institutions—Astronomical Surveys	14 46
A. Kyle	Refund of amount paid for overtime services in January, 1916, $13.00; in February 1916, $12.50—Immigration Expenses	25 50
Frank Chillick	Cheque No. 3750 of June 20th, 1916, being refund on account overcharges in his expenses of 1915-16—Immigration Expenses	3 60
E. J. Cleven	Cheque No. 3737 of June 20, 1916, being refund on account overpayment in salary in March, 1916—Immigration Expenses	10 94
P. J. Webb	Cheque No. 1846 being refund of balance outstanding in his contingent account for 1915–16—Immigration Expenses	67 00
A. G. Tait	Pt. Cheque No. 3704 of June 20th, 1916, being refund on account Immigration expenses, 1914–15—Immigration Expenses	

F.—STATEMENT of Casual Revenue for the fiscal year ended March 31, 1917—*Continued.*

Name.	Particulars.	Amount.
		$ cts.
J. P. Stafford	Being refund by S. Morisset of one-half cost of uniform suit purchased for use of D. Renaud who left Department in 1915—Immigration Expenses	5 00
Inspector of Prisons and Public Charities for Ontario, Toronto Ont.	Being one-half cost of deportation expenses of Wm. A. Baillie in March, 1916—Immigration Expenses	31 58
J. H. Duncan	Proceeds of sale of old buggy by Inspector A. E. Henke —Dominion Lands and Parks—Contingencies	25 00
J. C. Hearn	Refund Cheque No. 6454 for June $ 65 00 Refund Cheque No. 6942 for February $ 65 00 Cheques not used—Dominion Lands and Parks—Salaries	130 00
J. W. McAbee	Refund in payment of articles belonging to the Forestry Branch, which were not returned—Dominion Lands and Parks—Forestry	50 00
T. H. Beddome	Refund to recoup Protection of Timber Appropriation—Dominion Lands and Parks—Protection of Timber	10 00
F. Fisher	Refund balance unexpended advances for expenses from Dominion Lands and Parks—Dominion Lands and Parks—Protection of Timber	268 43
Dr. G. L. Milne	Being refund by L. Ostler on account of repatriation expenses—Relief of Distressed Canadians	5 00
John Hoolahan	Being refund by Albert E. Burnett on account of his repatriation expenses in February, 1916—Relief of Distressed Canadians	5 00
E. W. Hubbell	Refund balance unexpended advances for Surveys 1915-1916—Dominion Lands and Parks—Surveys	7 45
Parkers Dye Works, Toronto, Ont.	Refund Astronomical Surveys Cheque No. 1969 dated 30th April, 1915, not used—Scientific Institutions—Astronomical Surveys	20 00
J. P. Stafford	Being refund by S. Morrisset of his staff for one-half purchase price of uniform made for D. Renaud, but not used—Immigration Expenses	5 00
Robin, Jones & Whitman, Ltd., (for the White Star Line)	Refund on account of maintenance, etc., of immigrants in Halifax Detention Hospital in February, 1915—Immigration Expenses	3 00
John Hoolahan	Being refund by Albert E. Burnett on account of his repatriation expenses in February, 1916—Relief of Distressed Canadians	5 00
G. L. Milne	Being refund by L. Ostler, on account of repatriation expenses, November, 1915—Relief of Distressed Canadians	5 00
Canadian Pacific Railway Co.	Being refund of unused portion of railway ticket purchased for transportation of R. E. Morrison in January, 1916—Relief of Distressed Canadians	9 45
Chan Yin Soon	Interior refund Cheque No. 1374 of July 28, 1916, being refund on account of his deportation expenses in January, 1916—Chinese Immigration	35 00
D. N. Trapnell	Refund Cheque No. 1655 dated 21st October, 1915, salary for October Cheque not used—Dominion Lands and Parks—Protection of Timber	93 33
E. H. Roberts	Refund of proceeds of sale of tents, etc., purchased through vote for Dominion Lands and Parks, Protection of Timber—Dominion Lands and Parks—Protection of Timber	16 60
T. H. Beddome	Cheque No. 4617, refund to recoup Protection of Timber appropriation—Doninion Lands and Parks—Protection of Timber	10 00
Supt. Rocky Mt. Park	Refunds proceeds sale of old bathing suits—Dominion Lands and Parks—Parks.	7 20
A. Driscoll	Refund on account of advances—Dominion Lands and Parks—Parks	0 48
J. Sylvestre	Refund proceeds sale of old canoe, formerly bought through Dominion Lands and Parks Surveys Appropriation—Dominion Lands and Parks—Surveys	10 00

F.—STATEMENT of Casual Revenue for the fiscal year ended March 31, 1917—*Continued.*

Name.	Particulars.	Amount.
		$ cts.
W. E. Venning	Proceeds *re* sale of old utensils, etc., at Gravelbourg Immigration Hall:— 1 cook stove, 1 heating stove, 1 ash tin— Pots and pans, 6 chairs—Immigration Expenses	40 00
S. N. Reid	Being refund on account expenses *re* Rossman Odegard case—Immigration Expenses	70 8
A. H. Clarkson	Being refund by Bell Telephone Co. of overpayment for exchange service in January, 1916—Immigration Expenses	5 00
D. H. Reynolds	Being proceeds of sale of various utensils at Port Arthur, Ont.—Immigration Expenses	20 00
John Hoolahan	Being refund by Albert E. Burnett on account of his repatriation expenses in February, 1916—Distressed Canadians	3 00
J. Bruce Walker	Being refund on account of repatriation expenses of Alfred Ford—Distressed Canadians	2 00
John Hoolahan	Refund on account of expenses *re* repatriating Oscar Leriche—Distressed Canadians	5 15
Dr. G. L. Milne	Being refund by T. Ostler on account repatriation expenses—Distressed Canadians	5 00
A. D. L. Humboldt	Proceeds sale of horse formerly used by Hd. Inspector Roth—Dominion Lands and Parks—Contingencies	55 00
Immigration Branch	Refund of amount paid by the D. L. A. Swift Current, last spring, for salary of Miss G. DeCuttes—Dominion Lands and Parks—Contingencies	30 00
Major E. W. Hubbell	Refund amount of balance due Department on account of sale of 3 canoes, being outfit belonging to the equipment of J. W. Pierce, Sub-division Surveys, 1915—Dominion Lands and Parks—Surveys	67 50
M. H. Graham	Refund balance on hand advances for expenses—Civil Government Contingencies	50 00
Paul Howard	Being salary, Cheques No. 7643, 8083 for $150.00 each, for January and February, 1916, not used—Immigration O. S. Salaries	300 00
Wm. Mather	Refund in payment of survey of land at Banff—Dominion Lands and Parks—Parks	31 50
Receiver General	Refund of fees paid on account of costs *re* Hanson case at Waterton Lakes Park, deposited to Dominion Parks in error, should be casual revenue, 1915-16, File No. N.L. 5 Dominion Parks—Dominion Lands and Parks—Parks	2 78
S. M. Rogers	Refund on account Jasper Park Trust Account—Dominion Lands and Parks—Parks	129 92
S. M. Rogers	Refund balance on hand advances for expenses at Jasper Park. 1914-15, Cheque No. 920—Dominion Lands and Parks—Parks	129 92
A Williscraft	Being refund proceeds sale of pack sack, formerly purchased through Dominion Lands and Parks—Protection of Timber	2 60
T. H. Beddome	Refund to recoup Protection of Timber appropriation for loss through' his neglect of duty—Dominion Lands and Parks—Protection of Timber	10 00
A. J. Bruce	Refund in payment for one key lost, formerly purchased through Forestry Branch—Dominion Lands and Parks—Protection of Timber	1 00
D. R. Cameron	Refund in payment for three keys lost—Dominion Lands and Parks—Protection of Timber	3 00
G. Fitzgibbons	Refund salary cheques for July, August, September, October and November, 1915, 4 for $75.00 each, Cheques Nos. 3287, 3763, 4251 and 4728; Cheques for September, $55.00. Cheques not used—Dominion Lands and Parks—Salaries	355 00
Canadian Pacific Railway Co	Refund on account of maintenance of Dorinda Busterd in St. John Detention House—Immigration Expenses	1 80

F.—STATEMENT of Casual Revenue for the fiscal year ended March 31, 1917—*Continued.*

Name.	Particulars.	Amount.
		$ cts.
Thos. Wilson	Being refund by Mrs. Margaret McDonald of balance due on account of repatriation expenses—Distressed Canadians	3 95
John Hoolahan	Being refund by Albert E. Burnett on account repatriation expenses—Distressed Canadians	2 00
T. H. Beddome	Refund to recoup Protection of Timber Appropriation—Dominion Lands and Parks—Protection of Timber	10 00
Chief Fire Ranger, Prince Albert	Refund overpayment for freight, March, 1916–Dominion Lands and Parks—Forestry	10 60
H. G. Cuttle	Refund proceeds sale of furniture, etc., Regina Land Office—Dominion Lands and Parks—Contingencies	18 85
District Supt. of Telephone, Regina	Refund unused rent on telephone in Regina land office–Dominion Lands and Parks—Contingencies	1 40
C.P.R. Co	Refund ticket Toronto to Montreal *re* Gertrude Shaw, a deport—Ticket purchased by Mrs. Tasse—Immigration Expenses	6 65
Mrs. Baker (Per J. Obed Smith) London, Eng	Refund account expenses incurred by Commissioner of Immigration Winnipeg, in full of 1915, *re* investigation in the case of Fred Grossman Baker—Immigration Expenses	21 28
Edmund Lawrence	Refund on account expenses—Relief of Distressed Canadians	23 45
T. H. Beddome	Refund to recoup Protection of Timber Appn.—Dominion Lands and Parks—Protection of Timber.	10 00
H. Shaw	Cheques Nos. 3050 and 3076 for $14.51 and $22.50, held *re* tools not accounted for—Dominion Lands and Parks—Forestry	37 01
A. Norquay	Refund on account of advance for expenses, 1915–1916–Dominion Lands and Parks—Contingencies	166 66
A. Norquay	Refund unexpended balance of advance for expenses, 1915–1916—Dominion Lands and Parks—Contingencies	19 60
J. W. Stafford	Refund unexpended balance for expenses, 1915—Dominion Lands and Parks—Contingencies	4 34
Superintendent Revelstoke Park	Refund proceeds *re* sale of provisions in November 1914—Dominion Lands and Parks—Parks	3 96
C. H. Anderson	Salary cheques for December 1915, January and February 1916, not used—Dominion Lands and Parks—O. S. Salaries	225 00
T. H. Gilmour	Per A. R. Morisset, being refund on account Immigration expenses, 1914–15—Immigration Expenses	56 80
T. H. Gilmour	Being refund of expenses—Immigration Expenses	65 00
H. D. Lyon	Being cheque in favour of H. D. Lyon, issued by H. H. Russell, which could not be cashed for lack of funds—Immigration Expenses	10 00
Dr. G. L. Milne	Being refund by L. Ostler on account repatriation expenses—Distressed Canadians	5 00
John Hoolahan	Being refund by Oscar Leriche on account of repatriation expenses in 1914— Distressed Canadians	14 00
Paymaster, 223rd Battalion Camp Hughes, Man	Being refund by Sergeant Major Chas. A. Nord on account repatriation expenses of himself and family in May, 1915—Distressed Canadians	5 00
A. D. L. Edmonton	Refund proceeds sale of old harness—Dominion Lands and Parks—Contingencies	8 00
E. H. Finlayson	Refund of amount of cheques issued for fire fighting in 1914–15 which were never called for—Dominion Lands and Parks—Protection of Timber	270 75
H. S. Day	Refund of surveys cheque No. 2148, dated 8th April, 1916. Cheque not used—Dominion Lands and Parks—Surveys	0 78
J. H. Wilson	Refund balance unexpended advances for expenses 1915–16—Dominion Lands and Parks—Irrigation Surveys	45 00
P.O. Dept. Ottawa	Refund from the Side Stream Navigation Co. at Dawson for freight charges paid in 1913, by Mr. Lambart, see Astronomical Surveys	50 00

F.—STATEMENT of Casual Revenue for the fiscal year ended March 31, 1917—*Continued.*

Name.	Particulars.	Amount.
		$ cts.
E. W. Hubbell	Refund balance on hand advances for expenses in 1915-16—Board of Examiners—D. L. S.	1 15
Union Bank, Grande Prairie	Refund of balance unexpended *re* relief advanced in 1913, out of the Immigration vote—Immigration Expenses	180 34
Paymaster, 223rd Battalion Portage la Prairie, Manitoba	Being refund by Chas. A. Nord on account repatriation expenses—Distressed Canadians	5 00
John Hoolahan	Being refund by Albert E. Burnett, on account of repatriation expenses—Distressed Canadians	5 00
G. L. Milne	Refund by L. Ostler on account of repatriation expenses—Distressed Canadians	5 00
Paymaster, 198th Battalion, Toronto, Ontario	Being refund by Private G. H. L. Marescaux on account repatriation expenses—Distressed Canadians	2 00
John Hoolahan	Being refund by E. V. Portway on account of his repatriation expenses in September 1914—Distressed Canadians	21 29
Thos. Vickers	Refund on account provisions advanced in 1912, out of Immigration Vote—Distressed Canadians	92 00
Elizabeth A. O'Connor	Refund on account repatriation expenses in September 1915—Distressed Canadians	45 50
H. R. Cameron	Proceeds sale of flour, rolled oats and grass seed sold to Mr. McDonald—Peace River Relief, 1912	50 00
Mrs. A. Chapman	Refund on account repatriation expenses incurred in August 1914—Distressed Canadians	5 00
J. F. McKenzie	Refund of proceeds sale of horse—Dominion Lands and Parks—Contingencies	50 00
D. Matheson	Refund on cheques Nos. 2938 and 3181 dated October 14th and December 28th, 1915—Dominion Lands and Parks—Parks	13 80
T. H. Beddome	Refund to recoup Protection of Timber—Dominion Lands and Parks—Protection of Timber	7 61
W. B. Wright	Refund to pay for article not returned to Forestry Branch, Protection of Timber cheque No. 6641 dated 30th November—Dominion Lands and Parks—Protection of Timber	4 40
H. L. Maingay	Being refund of ocean passage of his wife $50.25, and dog $11.56, from England to Canada paid by J. Obed Smith, March 1916—Immigration Expenses	61 81
E. W. Hubbell	Refund amount overpaid for services in 1915-16—Dominion Lands and Parks—Board of Examiners, D. L. S.	20 00
Grand Trunk Pacific Railway Company	Refund on account of purchase of grain exhibits as follows:— 3 cases marquis wheat in straw, 1 case barley in straw, 1 " rye in straw, 2 cases oats in straw, 1 case flax in straw, ½ " long and short red top, ½ " timothy, 1 " Pea-vine, vetches and clover. 10 cases at $30 each ..... $ 300 00 Less allowance for 10 cases at $2.50 each .. 25 00 $ 275 00 Immigration Expenses	275 00
G. L. Milne	Being refund by L. Ostler, on account repatriation expenses—Distressed Canadians	5 00
Paymaster, 223rd Battalion Overseas, Portage la Prairie, Manitoba	Being refund by Chas. A. Nord on account of repatriation expenses—Distressed Canadians	5 00

F.—STATEMENT of Casual Revenue for the fiscal year ended March 31, 1917—*Continued.*

Name.	Particulars.	Account.
		$ cts.
Paymaster, 198th Battalion Overseas, Toronto, Ontario	Being refund by Private G. H. L. Mariscaux, on account of repatriation expenses—Distressed Canadians	2 00
Superintendent Buffalo Park	Refund of amount received for groceries sold by Superintendent of Buffalo Park—Dominion Lands and Parks—Parks	1 76
Canadian Pacific Railway Company	Refund of overpayment for freight, Pt. cheque No. 2959, dated October, 1915—Dominion Lands and Parks—Parks	33 00
A. D. L. Humboldt	Refund proceeds sale of old cutter used by Hd. Inspr. Smyth—Dominion Lands and Parks—Contingencies	5 00
Receiver General	Being refund by late E. J. Cleven on account salary for March, 1916—Immigration O. S. Salaries	37 00
Department of Militia and Defence	Payment for goods purchased from Immigration Hall, Calgary—Immigration Expenses	458 55
Chas. A. Nord	Refund on account repatriation expenses—Relief of Distressed Canadians	5 00
A. E. Burnett	Refund on account of depatriation expenses—Relief to Distressed Canadians	2 82
Receiver General	Refund duplicate payment made to Northern Trading Company cheque No. 3330, April 7th, 1916—Dominion Lands and Parks—Forestry	19 00
Eberts & Taylor & Hugh Little	Cheque No. 1319 not used, dated March 7th, 1916—Astronomical Surveys	250 00
Union Stock Yards	Amount received for team bought from C. A. Biggar, purchased by him in 1915—Astronomical Surveys	365 40
N. V. Bennett	Sale of old flat top desk—Immigration Expenses	5 00
Stanley Kurchaba	Refund on account repatriation expenses—Distressed Canadians	33 44
H. C. Sweeney	Refund by W. La Barre on account repatriation expenses—Distressed Canadians	113 15
G. H L. Marescaux	Refund on account of repatriation expenses—Distressed Canadians	2 00
C. A. Nord	Refund on account of repatriation expenses—Distressed Canadians	5 00
G. H. L. Marèscaux	Refund on account repatriation expenses—Distressed Canadians	2 00
L. Ostler	Refund on account of repatriation expenses—Distressed Canadians	5 00
L. Ostler	Refund on account of repatriation expenses—Distressed Canadians	10 00
E. Cook	Refund in payment of pair of binoculars—Dominion Lands and Parks—Forestry	12 00
G. A. Gutches	Refund on account of advances for 1914-15—Dominion Lands and Parks—Forestry	1 06
J. H. Brownlee	Refund balance *re* advance on April 27th, 1915—Dominion Lands and Parks—Surveys	20 00
B. H. Baldwin	Amount received for sale of motor—Dominion Lands and Parks—Surveys	25 00
A. D. L. Battleford	Refund proceeds sale of team of horses used by Inspector A. C. Dewar—Dominion Lands and Parks—Contingencies	125 00
A. D. L. Edmonton	Refund proceeds *re* sale of old jumper used by Head Inspector McCowan—Dominion Lands and Parks—Contingencies	5 00
Department of Justice	Refund by A. Henderson on account advances for expenses—Yukon, Expenses of Government	25 00
Commissioner of Immigration	Proceeds *re* sale of grain left over in Peace River District, 1914; also a set of scales purchased in the same year—Immigration Expenses	477 69
Department of Militia and Defence	Refund ocean fares of Major S. J. Robbins' family—Immigration Expenses	125 62
Commissioner of Immigration	Refund on account of repatriation expenses of T. R. Hendry in November, 1914—Relief of Distressed Canadians	5 00
Chas. A. Nord	Refund on account of repatriation expenses—Relief of Distressed Canadians	5 00

SESSIONAL PAPER No. 25

F.—STATEMENT of Casual Revenue for the fiscal year ended March 31, 1917—*Continued.*

Name.	Particulars.	Account.
		$ cts
A. M. Narraway	Refund proceeds *re* sale of canoe from W. Christie's outfit of 1914—Dominion Lands and Parks—Surveys	8 50
Canadian Pacific Railway Company	Payment of claim for lost hand car—Boundary Surveys.	44 69
F. K. Herchner	Proceeds sale of two canoes—Dominion Lands and Parks—Forestry	10 00
J. J. McArthur	Proceeds *re* sale of old boats and outfits—Astronomical Surveys	562 55
Comptroller Yukon	Refund balance to credit following estate:—	296 21
	Marion Humphrey $ 49 50	
	E. E. Collins 2 25	
	John Grant 50 10	
	Mike Kovack 100 00	
	Owen Maylin 66 55	
	R. W. Tharp, Alias Brown 16 25	
	Tom Bokovich 11 56	
Comptroller Yukon	Balance to the credit of the estate of the late Henry Cook	1,036 94
Maxwell Graham	Refund on account travelling expenses—Civil Government—Contingencies	50 00
Maxwell Graham	Refund on account travelling expenses—Civil Government—Contingencies	99 01
Superintendent Buffalo Park	Balance unexpended on account advances for expenses—Dominion Lands and Parks—Parks	0 02
A. D. L. Edmonton	Proceeds *re* sale of Head Inspector Fane's team—Dominion Lands and Parks—Contingencies	89 35
A. D. L. Edmonton	Proceeds of sale of old buggy used by Head Inspector Hagen—Dominion Lands and Parks—Contingencies	23 00
A. D. L. Edmonton	Proceeds *re* sale of team used by Head Inspector Wynne—Dominion Lands and Parks—Contingencies	35 00
Superintendent Rocky Mt. Park	Refund on account telephone service N. P. School—Dominion Lands and Parks—Parks	19 64
Commissioner of Immigration, Winnipeg	Balance unexpended *re* advances to W. M. Jackson—Immigration Expenses	5 35
Bank of Montreal, London, England.	Refund by Mrs. Walter Quinn on account deportation expenses during 1915–1916—Immigration Expenses—	7 30
Bank of Montreal, London, England.	Refund by Mrs. A. W. Sherwood *re* transportation of child to England—Immigration Expenses	31 94
Bank of Montreal, London, England.	Refund by Board of Guardians for annual inspection of poor law children who emigrated to Canada in 1915—Immigration Expenses	1,408 47
Bank of Montreal, London, England.	Refund by Mr. Quinn *re* deportation expenses—Immigration Expenses	12 17
		15,384 26
Less Refunds		277 74
		15,106 52

CASUAL REVENUE, NORTHWEST TERRITORIES.

Name.	Particulars.	Amount.	
		$ cts.	$ cts.
	Forward		15,106 52
Bishop G. Breynat	Fee payable on liquor. Permit No. 209 issued in favour of Father J. C. Lefebvre, O.M.I.	3 00	
R. J. McLennan	Permit for 2 gallons liquor	2 00	
Jack Starke	Liquor Permits	2 00	
Geo. Norn	Liquor Permits	2 00	
Mayse Manville	Liquor Permits	2 00	
Louise Laferty	Liquor Permits	2 00	
Mrs. A. Loutet	Liquor Permits	2 00	
Alex. Loutet	Liquor Permits	4 00	
Geo. Boucher	Permit for 2 gallons whisky	2 00	
Jas. H. Bryan	Permit for 2 gallons liquor	2 00	
Hudson Bay Co. employees	Liquor permits	148 00	
Northern Trading Co., Ltd	Fees payable on liquor permits issued to employees	57 00	
Hudson Bay Co	Fees on liquor permits issued as follows:—		
	H. W. Jones $ 2 00		
	Fred McLeod 2 00		
	D. Danes 2 00		
		6 00	
			234 00
	Net Total		15,340 52

G.—Statement Showing Repayments on account of Seed Grain and Relief Mortgages for the fiscal year ending March 31, 1917.

	Seed Grain Advances.														Territorial Account.	Relief Mortgages.	Relief Advances.	Relief Advances.	Total.
	1916.	1915.	1914.	1913.	1912.	1911.	1909.	1908.	1901.	1900.	1896.	1895.	1894.	1890.	1886-7-8.	1876.	1915.		
	8,714 60	2,253,166 08	6,213 61	2,110 31	13,821 98	16,572 42	555 27	4,581 80	217 75	2 76	349 39	414 14	714 09	. .	233 36	605 45	1,330,026 18	14,429 83	3,652,729 05
Refunds.....	.....	16,959 97	159 80	29 65	241 28	79 39	...	431 34	....	.	2 30	9 38	16 05	50 00	.....	.....	18,063 37	19 95	36,062 48
	8,714 60	2,236,206 11	6,053 84	2,080 66	13,580 70	16,493 03	555 27	4,150 46	217 75	2 76	347 09	404 76	698 04	...	233 36	605 45	1,311,962 81	14,409 88	3,616,666 57

H.—STATEMENT of Fines under Immigration Act for the fiscal year ending March 31, 1917.

Month.	From Whom Received.	Amount.
1916.		$ cts.
April	James C. Mitchell	20 00
May	James C. Mitchell	100 00
June	A. E. Skinner	10 00
July	T. D. Cowper	80 00
July	D. H. Reynolds	75 00
July	D. H. Reynolds	75 00
August	M. R. J. Reid	48 00
August	A. E. Skinner	25 00
August	Wm. Lindsay	8 90
August	L. A. Duncan and W. Addy	155 00
September	D. H. Reynolds	200 00
September	J. J. Williams	100 00
October	Sheriff Gemmill	49 00
October	J. H. Cameron	25 00
November	T. D. Cowper	354 00
November	D. H. Reynolds	150 00
November	Alfred Miers	20 00
November	D. H. Reynolds	50 00
November	D. H. Reynolds	50 00
November	J. S. Clute	300 00
1917.		
January	T. D. Cowper	55 00
January	J. A. Mitchell	49 82
January	H. Bell	20 00
February	E. Hollingsworth	50 00
March	H. Bell	20 00
		2,089 72
	Less Refunds	200 00
		1,889 72

I.—STATEMENT of Chinise Immigration Revenue Collected by Ports during the fiscal year 1916-17.

Port.	Number of Chinese Exempts.	Paying Head Tax.		Registrations for Leave.		Other Revenue.	Total Revenue.
		Number of Chinese.	Amount.	Number.	Amount.		
			$ cts.		$ cts.	$ cts.	$ cts.
Victoria	58	16	8,000 00	1,318	1,318 00	25 00	9,343 00
Vancouver	68	37	17,500 00	1,992	1,992 00	525 00	20,017 00
Montreal	.....	152	76,000 00	2	2 00	.....	76,002 00
Ottawa	.....	58	29,000 00	.....	.....	625 00	29,625 00
Halifax	.....	6	3,000 00	.....	.....	.....	3,000 00
Sydney	.....	5	2,500 00	.....	.....	.....	2,500 00
All Ports	121	272	136,000 00	3,312	3,312 00	1,175 00	140,487 00

J.—STATEMENT of Receipts on account of Sales of Land, which Amounts have been credited to the Special Accounts of the following Railway Companies for the fiscal year ended March 31, 1917.

Railway Company.	Date of Order in Council.	Amount.	Total.
		$ cts.	$ cts.
Calgary and Edmonton Railway	August 17th, 1908	172,377 00	
Qu'Appelle, Long Lake and Saskatchewan Railway	May 8th, 1907, July 10th, 1907	188,293 44	
Lake Manitoba Railway and Canal Company	December 5th, 1908	46,455 27	
Canadian Northern Railway System			407,125 71

"K" see next page.

L.—STATEMENT of Gross Receipts (cash and scrip) on account of Dominion Lands Revenue for the fiscal year ended March 31, 1917, as compared with the previous year.

Particulars.	1916–1917.	1915–1916.	Increase.	Decrease.	Net Increase.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Dominion Lands Agencies	2,934,509 85	1,364,566 99	1,569,942 86	.....	
Crown Timber Agencies	414,842 61	367,397 85	47,444 76	.....	
Hay, Mining, Coal, Grazing, etc.	620,468 33	483,135 12	137,333 21	.....	
Yukon Territory	174,565 92	191,046 43	.....	16,480 51	
Canadian National Parks	45,851 45	37,493 53	8,357 92	.....	
Totals	4,190,238 16	2,443,639 92	1,763,078 75	16,480 51	1,746,598 24

K.—STATEMENT of Gross Cash Receipts on Account of Dominion Lands Revenue for the fiscal year ended March 31, 1917.

Month.	Homestead Fees.	Pre-emption and Purchased Homestead Fees.	Improvements.	General Sales of Land.	Timber Dues.	Rental from Grazing Lands.	Export Tax on Gold Mining Fees, Hay, Coal, Petroleum, etc.	Canadian National Parks.	Survey Fees.	Map Sales, Rentals Office Fees, and Miscellaneous	Total.
1916.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April	10,180 00	1,120 00	7,213 28	128,790 45	51,900 39	9,163 72	22,393 12	2,728 60	746 97	5,344 79	239,581 32
May	14,770 00	2,070 00	10,859 03	131,320 59	39,890 55	12,481 61	51,464 27	3,212 83	303 61	2,317 36	268,689 85
June	14,620 00	2,600 00	11,048 68	173,404 85	25,634 87	14,465 22	34,927 26	3,491 80	263 70	1,434 06	281,890 44
July	13,980 00	2,060 00	13,446 56	174,357 16	51,191 83	9,409 62	50,014 06	7,209 03	595 90	1,731 92	323,896 08
August	10,860 00	1,830 00	10,401 03	189,505 43	45,630 35	9,348 89	60,425 88	8,221 02	342 82	1,418 53	337,983 95
September	10,300 00	1,620 00	9,926 93	137,935 75	28,044 45	6,319 75	58,099 51	4,737 93	319 10	1,669 97	258,973 39
October	8,340 00	1,640 00	13,101 33	174,155 10	56,624 66	11,367 34	53,056 23	2,572 83	764 69	1,420 26	323,042 44
November	8,690 00	1,210 00	9,905 26	377,481 79	16,443 03	10,103 76	56,930 13	2,418 00	190 70	2,527 12	485,899 79
December	7,230 00	1,100 00	8,971 88	418,763 79	21,401 63	12,671 27	39,121 84	2,156 24	1,262 70	1,713 23	514,392 58
1917.											
January	4,550 00	760 00	6,209 62	280,117 26	44,325 25	11,487 61	47,581 35	2,395 69	382 28	3,007 10	400,816 16
February	3,320 20	620 00	4,791 63	209,297 46	22,218 37	7,496 76	51,585 69	3,015 53	540 83	2,142 22	305,028 69
March	5,270 00	720 00	6,836 10	312,174 36	26,097 71	14,025 95	75,334 79	3,691 95	925 38	4,634 62	449,710 86
	112,110 20	17,350 00	112,711 33	2,707,20399	429,403 05	128,341 50	600,934 13	45,851 45	6,638 68	29,361 18	4,189,905 55

SESSIONAL PAPER No. 25

Annual report of the School Lands' Branch of the Department of the Interior for the fiscal year ending March 31, 1917.

Sales.

During the months of June and July, 1916, auction sales were held at Moosomin, Broadview, Indian Head, Wymark, Kindersley and Redvers, in the province of Saskatchewan, and at Carmangay, Vulcan and Munson, in the province of Alberta.

At these sales 80,640.85 acres were disposed of in the province of Saskatchewan, realizing $1,090,294.19, an average of $13.52 per acre. In Alberta 66,034.87 acres were disposed of, realizing $826,703.45, an average of $12.52 per acre.

In addition to the amounts realized as shown above, $5,935 were also realized from the sale of town lots at Wymark, Sask.

In November, 1916, another series of auction sales were held at the following points:—

Rossburn, Glenella and Dauphin, in Manitoba.
Kamsack, Blaine Lake and Biggar, in Saskatchewan, and
Provost, Sedgewick and Chinook, in Alberta.

In Manitoba 37,359.80 acres were sold, realizing $352,362.92, an average of $9.43 per acre.

In Saskatchewan 35,463.66 acres were sold, realizing $570,761.29, an average of $16.09 per acre.

In Alberta 78,762.93 acres were sold, realizing $1,210,429.07, an average of $15.39 per acre.

In Manitoba the total area sold for the year, including the area sold to railway companies and for school sites, was 37,370.10 acres, realizing $352,538.52; in Saskatchewan 116,695.29 acres, realizing $1,664,233.70; and in Alberta 144,993.03 acres, realizing $2,039,037.37.

At the end of the fiscal year, March 31, 1917, after making the necessary adjustments on account of cancellation, etc., the total net area sold in each province, down to that date, was as follows:—

Manitoba, 692,250.06 acres for $6,700,321.54, average, $9.68.
Saskatchewan, 731,829.78 acres for $10,618,224.25, average, $14.51.
Alberta, 701,894.94 acres for $8,538,826.25, average, $12.17.

The sum of $5,388 has been realized from sales of townsites in Manitoba; $16,463 in Saskatchewan, in addition to the amounts as shown above.

GRAZING PERMITS.

During the year approximately 173 grazing permits were issued in Manitoba, 2,144 in Saskatchewan and 1,460 in Alberta, making a total of 3,777.

The total revenue derived from this source, for the three provinces, was $75,181.32.

COAL.

During the year fifteen coal leases were issued and the number of leases in force is 105.

The revenue derived from this source, for the three provinces, was $7,916.26.

PETROLEUM AND NATURAL GAS.

Twenty-six leases for this purpose were issued, and the number in force at the end of the fiscal year was 1,132.

The revenue derived from this source, for the three provinces, was $6,705.29.

HAY.

One lease was issued for the purpose of cutting hay, and 6,870 permits.

The revenue derived from this source for the year, for the three provinces, was $9,711.09.

TIMBER.

136 timber permits were issued during the fiscal year.

The revenue derived from this source, for the three provinces, was $3,383.12.

CULTIVATION.

Twenty-seven permits for this purpose were issued for such portions of school lands as had already been broken and had not returned to their original condition of prairie.

The revenue derived from these permits amounted to $425.15.

Statements herewith lettered A, B and C, respectively, show the revenue collected from school lands in the three provinces as classified.

The total net revenue from each province, during the fiscal year, was as follows:—

Manitoba	$ 283,243 01
Saskatchewan	759,464 33
Alberta	646,896 06
	$1,689,603 40

Under the provisions of the several Orders in Council, in that behalf, the net revenue collected from the school lands in each province during the fiscal year, less the principal moneys of sales, and less, also, the expenditure paid over to the government of each province, the amounts paid over being as follows:—

Manitoba—	
Total net revenue	$283,243 01
Less principal moneys of sales	210,141 82
Revenue other than principal moneys	$73,101 19
Less expenditure	13,053 69
Amount paid to province	$60,047 50
Saskatchewan—	
Total net revenue	$759,464 33
Less principal moneys of sales	541,877 52
Revenue other than principal moneys	$217,586 81
Less expenditure	15,962 26
Amount paid to province	$201,624 55
Alberta—	
Total net revenue	$646,896 06
Less principal moneys of sales	468,442 48
Revenue other than principal moneys	$178,453 58
Less expenditure	16,239 05
Amount paid to province	$162,214 53

In addition to the foregoing the following amounts were paid to the provincial governments of Manitoba, Saskatchewan and Alberta, as interest on the school lands' fund for the fiscal year, viz:—

Manitoba	$119,198 61
Saskatchewan	100,846 82
Alberta	86,550 43
	$306,595 86

The total amount paid to each province for the fiscal year was as follows:—

Manitoba	$179,246 11
Saskatchewan	302,471 37
Alberta	248,764 96
	$730,482 44

The total expenditure for the fiscal year, on all accounts, was as follows:—

Manitoba	$13,053 69
Saskatchewan	15,962 26
Alberta	16,239 05
	$45,255 00

Statements lettered D, E and F show the balance standing to the credit of the school lands' funds, April 1, 1917, viz:—

Manitoba	$4,068,350 37
Saskatchewan	3,891,343 21
Alberta	3,099,222 01

The following is an approximate statement of the work of the branch during the fiscal year, viz:—

Letters received	25,082
" memorandums, telegrams, etc., sent out	31,175
Leases prepared	42
Statements of accounts, circular letters and notifications	20,000
Receipts issued	4,937
Grazing permits issued	3,777
Cultivation permits	27
Assignments registered	379
Requisitions for patents	488
" refunds	468

FRANK S. CHECKLEY,
Controller.

A.—Manitoba School Lands.—Statement of Revenue Collected from School Lands for fiscal year from April 1, 1916, to March 31, both dates inclusive.

Month.	Principal.	Interest.	Total.	Cultivation.	Grazing.	Timber.	Hay.	Registration Fees.	Petroleum and Nat. Gas.	Total.
1916.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April	7,983 78	3,505 83	11,489 61		160 02	50 25				11,699 88
May	8,495 13	2,598 32	11,093 45		122 40	309 80	772 75			12,298 40
June	26,108 37	14,249 22	40,357 59	8 00	76 37	80 80	449 80			40,972 56
July	11,830 69	4,857 44	16,688 13		114 41	38 87	406 42			17,247 83
August	9,985 30	3,492 68	13,477 98		35 20	90 25	63 00			13,666 43
September	8,083 53	1,418 17	9,501 70		9 60	178 30	26 30			9,715 90
October	7,114 38	5,682 49	12,796 87		43 32	60 00	14 90			12,915 09
November	68,895 36	11,615 72	80,511 08		35 45	161 00	2 50			80,710 03
December	27,990 96	9,286 06	37,277 02	4 00	68 41	193 25	0 50			37,543 18
1917.										
January	18,008 96	4,530 25	22,539 21	37 55	867 78	45 50	1 50			23,491 54
February	4,768 42	2,621 15	7,389 57		519 25	110 00				8,018 82
March	10,891 78	4,831 11	15,722 89		380 77	212 15	1 20			16,317 01
Total	210,156 66	68,688 44	278,845 10	49 55	2,432 98	1,530 17	1,738 87			284,596 67
Registration Fees								163 00		163 00
Total	210,156 66	68,688 44	278,845 10	49 55	2,432 98	1,530 17	1,738 87	163 00		284 759 67
Fees transferred to Dominion Lands						18 25	479 50			497 75
Total	210,156 66	68,688 44	278,845 10	49 55	2,432 98	1,511 92	1,259 37	163 00		284,261 92
Refunds	14 84	368 08	382 92	20 00	161 92	391 37	62 70			1,018 91
Total	210,141 82	68,320 36	278,462 18	29 55	2,271 06	1,120 55	1,196 67	163 00		283,243 01

B.—Saskatchewan School Lands.—Statement of Revenue from School Lands for fiscal year from April 1, 1916, to March 31, both dates inclusive.

Month.	Principal.	Interest.	Total.	Cultivation.	Grazing.	Timber.	Hay.	Registration Fees.	Petroleum and Natural Gas.	Coal.	Total.
1916.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April	7,549 80	4,191 62	11,741 42	40 50	3,631 45	11 75	23 40			309 45	15,757 97
May	22,655 61	6,849 65	29,505 26		3,275 11	53 10	3,911 65			2 00	36,747 12
June	50,355 86	23,218 50	73,574 36	45 00	2,484 58	1 50	1,908 15				78,013 59
July	173,952 84	23,979 19	197,932 03	5 00	1,381 91	201 25	1,658 50		169 68	129 33	201,477 70
August	16,711 03	6,562 89	23,273 92	3 00	1,205 08	164 92	459 35				25,106 27
September	15,713 60	7,580 50	23,294 10	15 00	365 69	310 77	61 70			5 00	24,052 26
October	27,132 21	7,024 53	34,156 74	37 50	77 87	52 50	16 20			226 60	34,567 41
November	108,991 03	31,524 86	140,515 89		396 34	8 75	9 05			102 00	141,032 03
December	52,512 63	22,212 09	74,724 72	40 00	1,623 87	26 00	3 90				76,418 49
1917.											
January	27,702 75	12,623 37	40,326 12	25 00	7,767 35	56 75	33 00			419 10	48,627 32
February	20,456 76	5,474 44	25,931 20	54 00	13,830 49	109 60	6 00			60 00	39,991 29
March	19,477 58	12,774 82	32,252 37	46 00	11,135 81	23 80	74 90		198 50	65 80	43,797 18
Total	543,211 67	164,016 46	707,228 13	311 00	47,175 55	1,020 69	8,165 80		368 18	1,319 28	765,588 63
Registration Fees								280 00			280 00
Total	543,211 67	164,016 46	707,228 13	311 00	47,175 55	1,020 69	8,165 00	280 00	368 18	1,319 28	765,868 63
Fees transferred to Dominion Lands						8 50	2,120 00				2,128 50
Total	543,211 67	164,016 46	707,228 13	311 00	47,175 55	1,012 19	6,045 80	280 00	368 18	1,319 28	763,740 13
Refunds	1,334 15	256 60	1,590 75		2,520 45	32 50	94 65			37 45	4,275 80
Total	541,877 52	163,759 86	705,637 38	311 00	*4,655 10	979 69	5,951 15	280 00	368 18	1,281 83	759,464 33

C.—Alberta School Lands.—Statement of Revenue Collected from School Lands for fiscal year from April 1, 1916, to March 31, both dates inclusive.

Month.	Principal.	Interest.	Total.	Cultivation.	Grazing Rent.	Timber.	Hay.	Registration Fees.	Coal.	Petroleum and Natural Gas.	Total.
1916.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April	10,073 80	3,840 86	13,914 66	.....	1,434 87	6 85	0 50	.....	349 50	409 50	16,115 88
May	18,691 83	7,310 43	26,002 26	11 50	1,468 27	465 58	1,308 80	.....	1,715 80	110 00	31,082 21
June	8,858 15	4,232 20	13,090 35	.....	1,500 18	2 50	861 28	.....	107 76	554 00	16,116 07
July	106,505 03	16,024 99	122,530 02	.....	921 13	84 27	708 87	.....	305 00	880 77	125,430 06
August	20,507 50	10,158 90	30,666 40	.....	912 64	100 90	423 20	.....	308 55	245 84	32,657 53
September	7,747 00	3,430 54	11,177 54	.....	411 58	10 00	22 80	.....	117 60	62 50	11,802 02
October	25,516 01	6,756 16	32,272 17	.....	156 40	301 31	23 20	.....	255 67	1,445 00	34,453 75
November	155,006 31	15,131 97	170,138 28	5 00	222 42	75 40	17 00	.....	540 34	.....	170,998 44
December	52,878 52	20,579 64	73,458 16	1 00	768 29	4 00	73 02	.....	721 95	.....	75,026 42
1917.											
January	24,668 33	23,116 75	47,785 08	.....	9,496 57	40 86	1 30	.....	227 07	.....	57,550 88
February	14,475 54	9,735 96	24,211 50	.....	8,684 71	116 61	1 00	.....	712 35	2,101 50	35,827 67
March	23,730 72	12,657 43	36,388 15	67 10	3,678 39	91 85	0 40	.....	1,322 94	575 00	42,123 83
Total	468,658 74	132,975 83	601,634 57	84 60	29,655 45	1,300 13	3,441 37	.....	6,684 53	6,384 11	649,184 76
Registration Fees	.....	.....	.....	.....	.....	.....	.....	397 75	.....	.....	397 75
Total	468,658 74	132,975 83	601 634 57	84 60	29,655 45	1,300 13	3,441 37	397 79	6,684 53	6,384 11	649,582 51
Fees transferred to Dominion Lands	.....	.....	.....	.....	.....	7 25	835 50	.....	.....	.....	842 75
Total	468,658 74	132,975 83	601,634 57	84 60	29,655 45	1,292 88	2,605 87	397 75	6,684 53	6,384 11	648,739 76
Refunds	216 26	77 45	293 71	.....	1,400 29	10 00	42 60	.....	50 10	47 00	1,843 70
Total	468,442 48	132,898 38	601,340 86	84 60	28,255 16	1,282 88	2,563 27	397 75	6,634 43	6,337 11	646,896 06

SESSIONAL PAPER No. 25

D.—MANITOBA SCHOOL LANDS.—Statement of Revenue and Expenditure on Account of Manitoba School Lands for fiscal year ended March 31, 1917.

Particulars.	Period.	Dr.	Cr.
		$ cts.	$ cts.
By Balance on April 1, 1916			3,858,208 55
" Sales	12 months ended Mar. 31, 1917		278,462 18
" Cultivation permits	" " "		29 55
" Timber dues, hay permits, grazing rentals and petroleum	" " "		4,588 28
" Registration fees	" " "		163 00
" Interest on fund	" " "		119,198 61
To Cost of management at Ottawa	" " "	6,028 91	
" Salaries, printing, advertising and general expenses	" " "	7,024 78	
" Revenue and interest paid to Manitoba Government	" " "	60,047 50	
" Interest on fund paid to Manitoba Government	" " "	119,198 61	
" Balance on March 31, 1917	" " "	4,068,350 37	
		4,260,650 17	4,260,650 17

E.—SASKATCHEWAN SCHOOL LANDS.—Statement of Revenue and Expenditure on Account of Saskatchewan School Lands for fiscal year ended March 31, 1917.

Particulars.	Period.	Dr.	Cr.
		$ cts.	$ cts.
By Balance on April 1, 1916			3,349,465 69
" Sales	12 months ended Mar. 31, 1917		705,637 38
" Cultivation permits	" " "		311 00
" Timber dues, hay permits, grazing rentals and petroleum	" " "		53,235 95
" Registration fees	" " "		280 00
" Interest on fund	" " "		100,846 82
To Cost of management at Ottawa	" " "	6,028 91	
" Salaries, printing, advertising and general expenses	" " "	9,933 35	
" Revenue and interest paid to Saskatchewan Government	" " "	201,624 55	
" Interest on fund paid to Saskatchewan Government	" " "	100,846 82	
" Balance on March 31, 1917	" " "	3,891,343 21	
		4,209,776 84	4,209,776 84

F.—Alberta School Lands.—Statement of Revenue and Expenditure on Account of Alberta School Lands for fiscal year ended March 31, 1917.

Particulars.	Period.	Dr.	Cr.
		$ cts.	$ cts.
By Balance on April 1, 1916			2,630,779 53
" Sales	12 months ended Mar. 31, 1917		601,340 56
" Cultivation permits	" " "		84 60
" Timber dues, hay permits, grazing rentals and petroleum	" " "		45,072 85
" Registration fees	" " "		397 75
" Interest on fund	" " "		86,550 43
To Cost of management at Ottawa	" " "	6,028 91	
" Salaries, printing, advertising and general expenses	" " "	10,210 14	
" Revenue and interest paid to Alberta Government	" " "	162,214 53	
" Interest on fund paid to Alberta Government	" " "	86,550 43	
Balance on March 31, 1917	" " "	3,099,222 01	
		3,364,226 02	3,364,226 02

LAND PATENTS BRANCH.

Report of the Land Patents Branch of the Department of the Interior for the fiscal year ended March 31, 1917, with statements in relation thereto, marked A to U, inclusive.

LETTERS PATENT.

The number of letters patent issued, during the period mentioned, was 18,774, covering an area of 3,019,178 acres, which may be classified as follows:—

Province—	Patents.	Acres.
Manitoba	1,225	192,668
Saskatchewan	10,230	1,636,551
Alberta	7,015	1,156,995
British Columbia	270	31,686
Yukon Territory	30	1,130
Northwest Territories	4	148
Total	18,774	3,019,178

These grants, which are given in detail in the statements marked A to G inclusive, may be summarized as follows:—

Grants—	Patents.	Acres.
Homesteads	12,901	2,098,385
Sales	902	129,237
Pre-emption sales	3,567	567,028
Purchased homesteads	748	117,660
Railways	445	79,569
Water supply right of way	16	2,158
Free grants	90	7,039
Hudson's Bay Company	34	16,997
Northwest half-breeds	6	965
Licenses of occupation	35	140
Quit claims	30	.....
Total	18,774	3,019,178

There was a decrease of 215 patents and 70,458 acres, as compared with the preceding year.

There are recorded in the Land Patents Branch 357,499 letters patent, aggregating 85,259,080 acres, which have been issued since May, 1873, to March 31, 1917. The accompanying statement marked H shows the number of patents issued each year during that period, with the acreage patented during each of such years.

LANDS DISPOSED OF.

Twelve thousand eight hundred and forty-one entries were granted during the year, aggregating approximate area of 2,067,360 acres, made up as follows:—

			Acres.
Homestead Entries—			
Manitoba	2,276		
Saskatchewan	4,105		
Alberta	4,550		
British Columbia	268		
		11,199	1,791,840
Pre-emption Entries—			
Saskatchewan	1,008		
Alberta	452		
		1,460	233,600
Purchased Homesteads—			
Saskatchewan	156		
Alberta	106		
		262	41,920
		12,841	2,067,360

There was a decrease in the number of homestead entries granted, as compared with the previous year, of 5,831 entries.

By land agencies, the 11,199 homestead entries were made up as follows:—

Manitoba—		
Dauphin	1,005	
Winnipeg	1,271	
		2,276
Saskatchewan—		
Battleford	518	
Estevan	1	
Humboldt	334	
Maple Creek	552	
Moosejaw	546	
Prince Albert	736	
Meadow Lake	7	
Regina	6	
Saskatoon	332	
Swift Current	493	
Weyburn	200	
Yorkton	380	
		4,105
Alberta—		
Calgary	511	
Edmonton	1,858	
Grande Prairie	836	
High Prairie	71	
Lethbridge	158	
Medicine Hat	443	
Peace River	423	
Red Deer	250	
		4,550
British Columbia—		
Kamloops	170	
New Westminster	47	
Revelstoke	51	
		268

The 11,199 entrants for homesteads represented 25,791 persons, as compiled from the information obtained from each entrant. Of these entries 3,483 were made by residents of the several provinces of the Dominion; 17 by Canadians who had returned from the United States; and 1,642 by persons who had obtained homestead entries, but which had either been cancelled by default or at the request of the entrants in order, in most cases, to enter for other lands; 2,159 were made by persons from the British Isles, 1,734 by Americans, 735 by Austro-Hungarians, 489 by Russians, 226 by Norwegians, 235 by Swedes, 75 by Germans, 65 by Frenchmen, 46 by Belgians, and the remaining 293 homestead entries were made by citizens of various other countries.

CANCELLED ENTRIES.

There were cancelled, during the same period, 11,421 entries, made up as follows:—

	Manitoba.	Saskatchewan.	Alberta.	British Columbia.
Homesteads	1,578	3,558	4,101	333
Pre-emptions	.....	1,092	655	.....
Purchased homesteads	.....	65	33	.....
Sales	9	6	9	2
Total	1,587	4,701	4,798	335

SALES.

Three hundred and eighty-nine sales were made during the fiscal year for 27,074 acres of land, with an average for each sale of about 69 acres.

NEWLY SURVEYED LANDS THROWN OPEN TO HOMESTEAD ENTRY.

During the past fiscal year newly surveyed lands, comprised in one hundred and eighty-four townships, were made available for homestead entry in the following land agencies:—

Dauphin	Manitoba	in 6 townships.
Maple Creek	Saskatchewan	" 1 "
Lethbridge	Alberta	" 1 "
Calgary	"	" 1 "
Edmonton	"	" 18 "
Grande Prairie	"	" 4 "
Grouard	"	" 12 "
Peace River Crossing	"	" 9 "
Revelstoke	British Columbia	" 28 "
Kamloops	"	" 63 "
New Westminster	"	" 41 "
	Total	184 "

ACCOUNTS AND REVENUE.

There are at present kept in the branch about 50,000 accounts in connection with purchased homesteads, pre-emptions and ordinary sales.

During the fiscal year $2,678,241.17, including $213,091.37 interest on deferred payments, was received on account of purchased homesteads, pre-emptions and ordinary sales, being an increase of $1,637,915.17 as compared with the payments received during the previous year.

REFUNDS.

In connection with the sales and moneys collected for the value of improvements on cancelled homesteads, there were 2,588 refunds made, amounting to $104,636.98, including 1,392 refunds, amounting to $80,946.58, on account of improvements, and in connection with seed grain accounts, 357 refunds, amounting to $17,089.56. The latter refunds were mostly made for duplicate and excess payments, while the refunds made on account of sales were for overpayments, and on cancelled purchased homesteads and pre-emption sales.

The following is a summary showing approximately the work performed in the Land Patents Branch during the fiscal year ended March, 1917:—

Files dealt with	252,700
Letters sent written in assistant secretary's office	5,180
" " " the branch	59,392
Notices sent patentees	42,102
" with statements of account sent to purchasers and Dominion Lands agents	44,940
Patents issued	18,774
Land entries checked and posted	12,921
Entries cancelled and recorded	11,421
Receipts issued	1,463
Requisitions for refunds prepared	2,588
Payments amounting to about $2,678,241.17 checked and posted.	
Assignments registered	88
Applications to purchase land dealt with	540
Seed grain certificates issued	30,355
" discharges	20,479
Certified copies of patents prepared	192
Preliminary plans sent to the different land agencies	184

A great number of plans and sketches were prepared as well as memoranda to Council and special reports, etc., of which no record is kept.

N. O. COTÉ,
Controller of Lands Patents Branch and
Registrar of Dominion Lands Patents.

A.—STATEMENT OF LETTERS PATENT covering Dominion Lands situate in Manitoba, Saskatchewan, Alberta, Northwest Territories, British Columbia and the Yukon Territory, issued from the Department of the Interior during the fiscal year ending March 31, 1917, as compared with the fiscal year ending March 31, 1916, and recorded in the Land Patents Branch.

No	Nature of Grant.	From April 1, 1916 to March 31, 1917.		From April 1, 1915 to March 31, 1916.	
		Patents.	Acres.	Patents.	Acres.
1	Alberta Railway and Irrigation Co's sales	34	34,065	24	10,769
2	British Columbia homesteads	144	17,687	152	19,622
3	British Columbia homesteads, Peace River Block	83	13,209	15	2,406
4	British Columbia sales	29	594	50	8,120
5	Coal lands sales	6	1,108	2	600
6	Coal surface sales			1	6
7	Commutation grants	1	50		
8	Greater Winnipeg Water District	15	2,148		
9	Homesteads	12,672	2,067,086	14,896	2,478,783
10	Hudson's Bay Co	34	16,997	83	77,455
11	License of occupation	35	140	26	111
12	Manitoba University grants	1	165	1	20
13	Military bounty grants			1	160
14	Military homesteads	1	243	2	647
15	Mining lands sales (102 acres, Under rights)	3	114	12	4,120
16	Mineral rights (819 acres)	5		19	
17	Northwest half-breed grants	6	965	7	1,019
18	Northwest half-breed grants, Peace River Block.			2	160
19	Parish sales	4	392	4	1,985
20	Pre-emption sales	3,567	567,028	1,429	226,448
21	Purchased homesteads	748	117,660	541	84,886
22	Quit claim, special grants (2,998 acres)	30		42	
	Railways—				
23	Alberta Central Railway Co			1	1
24	Alberta and Great Waterways Railway Co	2	13	1	1
25	Calgary and Edmonton Railway Co	84	26,989	48	15,369
26	Canadian Northern Alberta Railway Co	2	15		
27	Canadian Northern Railway Co	61	10,413	160	21,146
28	Canadian Northwestern Railway Co	5	81	18	289
29	Canadian Northern Pacific Railway Co			1	135
30	Canadian Pacific Railway grants	35	289	144	1,719
31	Canadian Pacific Railway roadbed and station grounds	11	88	2	7
32	Edmonton, Dunvegan and British Columbia Railway Co	16	237	18	120
33	Grand Trunk Pacific Railway	13	194	29	770
34	Grand Trunk Pacific Branch Lines Co	16	116	22	165
35	Kootenay Central Railway Co	1	9		
36	Manitoba and Southeastern Railway Co	6	910		
37	Qu'Appelle, Long Lake and Saskatchewan Railroad and Steamboat Co	191	40,160	170	37,956
38	Winnipeg River Railway Co	2	55		
39	Sales	352	29,427	541	33,251
40	School lands sales	440	62,567	343	53,689
41	Special grants	88	6,824	120	4,844
42	Vancouver Power Co. right of way	1	10		
43	Yukon Territory homesteads	1	160	2	299
44	Yukon Territory sales (40 acres, Under rights)	29	970	60	2,558
	Totals	18,774	3,019,178	18,989	3,089,636

SESSIONAL PAPER No. 25

B.—STATEMENT OF LETTERS PATENT covering Dominion Lands situate in the Province of Manitoba, issued from the Department of the Interior during the fiscal year ending March 31, 1917, as compared with the fiscal year ending March 31, 1916, and recorded in the Land Patents Branch.

No.	Nature of Grant.	From April 1, 1916 to March 31, 1917.		From April 1, 1915 to March 31, 1916.	
		Patents.	Acres.	Patents.	Acres.
1	Commutation grants	1	50		
2	Greater Winnipeg Water District	15	2,148		
3	Homesteads	919	145,135	692	108,977
4	Hudson's Bay Co	19	10,506	2	13,778
5	Manitoba University grants	1	165	1	20
6	Military homesteads			1	320
7	Mining lands sales (102 acres, Under rights)	2	95	12	4,120
8	Parish sales	4	392	3	527
9	Pre-emption sales	1	143	4	625
10	Quit claim, special grants (91 acres)	1		1	
	Railways—				
11	Canadian Northern Railway Co	23	381	105	1,483
12	Canadian Pacific Railway grants			1	1
13	Canadian Pacific Railway roadbed and station grounds	2	7		
14	Winnipeg River Railway Co	2	55		
15	Sales	37	1,980	24	1,857
16	School lands sales	183	30,881	143	28,175
17	Special grants	15	730	7	133
	Totals	1,225	192,668	996	160,016

C.—STATEMENT OF LETTERS PATENT covering Dominion Lands situate in the Province of Saskatchewan, issued from the Department of the Interior during the fiscal year ending March 31, 1917, as compared with the fiscal year ending March 31, 1916, and recorded in the Land Patents Branch.

No.	Nature of Grant.	From April 1, 1915, to March 31, 1917.		From April 1, 1915, to March 31, 1916.	
		Patents.	Acres.	Patents.	Acres.
1	Homesteads	6,789	1,109,426	8,124	1,346,128
2	Hudson's Bay Co	7	3,044	61	52,681
3	License of occupation	19	85	12	50
4	Mineral rights			5	
5	Northwest half-breed grants	3	563	1	161
6	Pre-emption sales	2,259	359,108	890	141,102
7	Purchased homesteads	499	78,003	359	56,202
8	Quit claim, special grants (2,753 acres)	24		32	
	Railways—				
9	Calgary and Edmonton Railway Co	2	321	1	804
10	Canadian Northern Railway Co	38	10,032	50	19,601
11	Canadian Pacific Railway grants	19	138	80	853
12	Canadian Pacific Railway roadbed and station grounds			1	1 6
13	Grand Trunk Pacific Railway	5	65	1	6
14	Grand Trunk Pacific Branch Lines Co	15	108	20	104
15	Manitoba and Southeastern Railway Co	6	910		
16	Qu'Appelle, Long Lake and Saskatchewan Railroad and Steamboat Co	191	40,160	170	37,956
17	Sales	169	16,273	282	16,801
18	School lands sales	148	16,004	106	12,249
19	Special grants	37	2,311	58	1,798
	Totals	10,230	1,636,551	10,253	1,686,502

D.—STATEMENT OF LETTERS PATENT covering Dominion Lands situate in the Province of Alberta, issued from the Department of the Interior during the fiscal year ending March 31, 1917, as compared with the fiscal year ending March 31, 1916, and recorded in the Land Patents Branch.

No.	Nature of Grant.	From April 1, 1916, to March 31, 1917.		From April 1, 1915, to March 31, 1916.	
		Patents.	Acres.	Patents.	Acres.
1	Alberta Railway and Irrigation Co's. sales	34	34,065	24	10,769
2	Coal lands sales	6	1,108	2	600
3	Coal surface sales			1	6
4	Homesteads	4,964	812,525	6,080	1,023,678
5	Hudson's Bay Co	7	3,418	18	10,880
6	License of occupation	16	55	14	61
7	Military bounty grants			1	160
8	Military homesteads	1	243	1	327
9	Mining lands sales	1	19		
10	Mineral rights (819 acres)	5		14	
11	Northwest half-breed grants	3	402	6	858
12	Parish sales			1	1,458
13	Pre-emption sales	1,307	207,777	535	84,721
14	Purchased homesteads	249	39,657	182	28,684
15	Quit claim, special grants (154 acres)	5		9	
	Railways—				
16	Alberta Central Railway Co			1	1
17	Alberta and Great Waterways Railway Co.	2	13	1	1
18	Calgary and Edmonton Railway Co	82	26,668	47	14,565
19	Canadian Northern Alberta Railway Co	2	15		
20	Canadian Northern Railway Co			5	62
21	Canadian Northwestern Railway Co	5	81	18	289
22	Canadian Pacific Railway grants	16	151	63	865
23	Edmonton, Dunvegan and British Columbia Railway Co	16	237	18	120
24	Grand Trunk Pacific Railway	8	129	28	764
25	Grand Trunk Pacific Branch Lines Co	1	8	2	61
26	Sales	143	11,055	234	14,580
27	School lands sales	109	15,682	94	13,265
28	Special grants	33	3,687	49	2,176
	Totals	7,015	1,156,995	7,448	1,208,951

SESSIONAL PAPER No. 25

E.—STATEMENT OF LETTERS PATENT covering Dominion Lands situate in the Province of British Columbia, issued from the Department of the Interior during the fiscal year ending March 31, 1917, as compared with the fiscal year ending March 31, 1916, and recorded in the Land Patents Branch.

No.	Nature of Grant.	From April1, 1916, to March 31, 1917.		From April 1, 1915, to March 31, 1916.	
		Patents.	Acres.	Patents.	Acres.
1	British Columbia homesteads	144	17,687	152	19,622
2	British Columbia homesteads, Peace River Block	83	13,209	15	2,406
3	British Columbia sales	29	594	50	8,120
4	Northwest half-breed grants	.....	.....	2	160
	Railways—				
	Canadian Northern Pacific Railway Co	.....	.....	1	135
6	Canadian Pacific Railway roadbed and station grounds	9	81	1	1
7	Kootenay Central Railway Co	1	9	.....	.....
8	Special grants	3	96	6	737
9	Vancouver Power Co., right of way	1	10	.....	.....
	Totals	270	31,686	227	31,181

F.—STATEMENT OF LETTERS PATENT covering Dominion Lands situate in the Yukon Territory issued from the Department of the Interior during the fiscal year ending March 31, 1917, as compared with the fiscal year ending March 31, 1916, and recorded in the Land Patents Branch.

No.	Nature of Grant.	From April 1, 1916, to March 31, 1917.		From April 1, 1915, to March 31, 1916.	
		Patents.	Acres.	Patents.	Acres.
1	Yukon Territory homesteads	1	160	2	299
2	Yukon Territory sales	29	970	60	2,558
	Totals	30	1,130	62	2,857

G.—STATEMENT OF LETTERS PATENT covering Lands situate in the Northwest Territories, issued from the Department of the Interior during the fiscal year ending March 31, 1917, as compared with the fiscal year ending March 31, 1916, and recorded in the Land Patents Branch.

No.	Nature of Grant.	From April 1, 1916, to March 31, 1917.		From April 1, 1915, to March 31, 1916.	
		Patents.	Acres.	Patents.	Acres.
1	Hudson's Bay Co	1	29	2	116
2	Sales	3	119	1	13
	Totals	4	148	3	129

H.—STATEMENT showing the number of Letters Patent issued by the Department of the Interior for Dominion Lands since 1873, and the number of acres patented.

Period.	No. of patents issued.	Acreage.
1873, May to December 31	420	67,200
1874, January 1 to December 31	577	92,320
1875, " 1 to October 31	464	74,240
1876, year ended October 31	318	50,880
1877, " " 31	2,437	478,840
1878, " " 31	2,357	462,880
1879, " " 31	2,663	426,080
1880, " " 31	1,084	173,440
1881, " " 31	1,885	400,862
1882, " " 31	2,197	506,785
1883, " " 31	4,341	831,341
1884, " " 31	3,896	909,604
1885, " " 31	3,533	898,464
1886, " " 31	4,570	942,055
1887, " " 31	4,599	1,071,364
1888, " " 31	3,275	647,644
1889, " " 31	3,282	661,636
1890, " " 31	3,273	626,019
1891, " " 31	2,449	411,073
1892, " " 31	2,955	549,257
1893, " " 31	2,936	502,601
1894, " " 31	2,553	420,238
1894, November and December	413	66,102
1895, year ended December 31	2,118	348,964
1896, " " 31	2,665	531,861
1897, " " 31	2,972	499,859
1898, " " 31	3,037	646,671
1899, " " 31	3,904	714,748
1900, January 1 to June 30	1,970	310,501
1901, year ended June 30	6,461	6,846,857
1902, " " 30	8,768	4,711,104
1903, " " 30	7,349	3,266,388
1904, " " 30	6,890	2,982,579
1905, " " 30	8,798	6,197,354
1906, " " 30	12,370	4,181,345
1906, July 1 to March 31, 1907	10,596	2,361,330
1908, year ended March 31	18,690	6,138,977
1909, " " 31	22,431	4,215,326
1910, " " 31	22,854	3,662,259
1911, " " 31	21,754	3,710,288
1912, " " 31	19,354	3,155,388
1913, " " 31	24,965	4,209,388
1914, " " 31	31,053	5,192,141
1915, " " 31	24,260	3,996,013
1916, " " 31	18,989	3,089,636
1917, " " 31	18,774	3,019,178
	357,499	85,259,080

SESSIONAL PAPER No. 25

I.—STATEMENT showing the number of Homestead Entries made during the fiscal year 1916-17, as compared with fiscal year 1915-16.

RECAPITULATION.

Agency.	MANITOBA.		SASKATCHEWAN.		ALBERTA.		BRITISH COLUMBIA.	
	1915–16.	1916–17.	1915–16	1916–17.	1915–16.	1916–17.	1915–16.	1916–17.
Battleford			739	518				
Brandon	86							
Calgary					685	511		
Dauphin	1,636	1,005						
Edmonton					3,202	1,858		
Estevan			23	1				
Fort Murray					39			
Grand Prairie					863	836		
High Prairie					27	71		
Humboldt			546	334				
Kamloops							236	170
Lethbridge					201	158		
Maple Creek			750	552				
Medicine Hat					398	443		
Moose Jaw			708	546				
New Westminster							123	47
Peace River					566	423		
Prince Albert			1,225	736				
Meadow Lake			85	7				
Regina				6				
Red Deer					429	250		
Revelstoke							54	51
Saskatoon			439	332				
Swift Current			762	493				
Weyburn			309	200				
Winnipeg	2,238	1,271						
Yorkton			661	380				
Total	3,960	2,276	6,247	4,105	6,410	4,550	413	268

Number of entries—

Fiscal year 1915-16	17,030
Fiscal year 1916-17	11,199
Net decrease for 1916-17	5,831

Month.	MANITOBA.		SASKATCHEWAN.		ALBERTA.		BRITISH COLUMBIA.	
	1916–17.	1915–16.	1916–17.	1915–16.	1916–17.	1915–16.	1916–17.	1915–16.
January	106	420	172	475	170	705	7	46
February	54	365	128	511	126	625	24	47
March	74	425	220	756	206	630	27	54
April	160	413	375	742	471	824	12	53
May	365	265	508	658	581	599	20	27
June	294	421	535	422	604	412	26	30
July	258	434	477	484	635	479	28	39
August	198	345	382	692	488	614	16	22
September	215	298	397	568	384	501	39	43
October	190	184	294	268	319	339	31	9
November	193	201	318	298	327	302	20	19
December	169	189	299	368	239	480	20	24
Total	2,276	3,960	4,105	6,247	4,550	6,410	268	413

J.—STATEMENT showing number of Homestead Entries granted in the Provinces of Manitoba, Saskatchewan, Alberta and British Columbia for fiscal year 1916-17, as compared with fiscal year 1915-16.

Agency.	1916–17.	1915–16.	Increase.	Decrease.
Manitoba.				
Brandon	.....	86	.....	86
Dauphin	1,005	1,636	.....	631
Winnipeg	1,271	2,238	.....	967
Total	2,276	3,960	.....	1,684
Saskatchewan.				
Battleford	518	739	.....	221
Estevan	1	23	.....	22
Humboldt	334	546	.....	212
Maple Creek	552	750	.....	198
Moose Jaw	546	708	.....	162
Prince Albert	736	1,225	.....	489
Meadow Lake	7	.....	7	.....
Regina	6	85	.....	79
Saskatoon	332	439	.....	107
Swift Current	493	762	.....	269
Weyburn	200	309	.....	109
Yorkton	380	661	.....	281
Total	4,105	6,247	7	2,149
Alberta.				
Calgary	511	685	.....	174
Edmonton	1,858	3,202	.....	1,344
Fort McMurray	.....	39	.....	39
Grande Prairie	836	863	.....	27
High Prairie	71	27	44	.....
Lethbridge	158	201	.....	43
Medicine Hat	443	398	45	.....
Peace River	423	566	.....	143
Red Deer	250	429	.....	179
Total	4,550	6,410	89	1,949
British Columbia.				
Kamloops	170	236	.....	66
New Westminster	47	123	.....	76
Revelstoke	51	54	.....	3
Total	268	413	.....	145

Grand total fiscal year 1915–16	17,030
" " 1916–17	11,199
Net decrease for fiscal year 1916–17	5,831

SESSIONAL PAPER No. 25

K.—STATEMENT showing the number of Homestead Entries made during the fiscal year ended March 31, 1916 and 1917, and the Nationality of the Homesteaders, as reported by the several Agencies of the Department in Manitoba, Saskatchewan, Alberta and British Columbia.

Nationalities.	No. of entries, 1916.	No. of entries, 1917.
Canadians from Quebec	505	496
" Ontario	1,885	1,500
" Nova Scotia	137	124
" New Brunswick	82	70
" Prince Edward Island	54	51
" Manitoba	1,137	657
" Saskatchewan	280	284
" Alberta	310	233
" British Columbia	63	68
Persons who had previous entry	2,779	1,642
Newfoundlanders	14	4
Canadians returned from the United States	19	17
Americans	2,416	1,734
English	2,374	1,469
Scotch	700	496
Irish	314	194
French	111	65
Belgians	103	46
Swiss	37	30
Italians	100	48
Roumanians	40	24
Syrians	5	5
Germans	170	75
Austro-Hungarians	1,745	735
Hollanders	50	41
Danes (other than Icelanders)	100	57
Icelanders	74	36
Swedes	342	235
Norwegians	309	226
Russians (other than Finns)	719	489
Finns	.....	9
Jews	6	.....
Chinese	4	.....
Japanese	2	3
Turks	4	.....
Australians	4	10
New Zealanders	2	.....
Serbians	4	2
Bulgarians	4	2
Hindoos	4	3
South Africans	4	3
Central Americans	4	.....
Montenegrins	1	.....
Arabians	2	.....
Brazilians	1	.....
South Americans	4	.....
Spanish	.....	3
Portuguese	.....	1
Poles	.....	7
Armenians	.....	1
Jamaicans	.....	3
Greeks	3	1
Mexicans	3	.....
	17,030	11,199

Number of souls represented by above entries..... 38,553—1916
" " ..... 25,791—1917

L.—STATEMENT showing the number of Homestead Entries made during the fiscal year ended March 31, 1916 and 1917, by persons coming from the various States and Territories of the American Union.

States.	No. of entries. 1916.	No. of entries. 1917.
Alabama	4	5
Alaska		
Arkansas		2
California	18	11
Carolina, North	5	6
Carolina, South	1	
Colorado	10	14
Columbia, District of		
Connecticut	6	2
Dakota, North	583	286
Dakota, South	138	93
Delaware		
Florida	2	
Georgia	3	2
Idaho	21	16
Illinois	122	110
Indiana	41	34
Indian Territory		
Iowa	145	107
Kansas	56	37
Kentucky	19	8
Louisiana	2	3
Maine	17	12
Maryland	3	2
Massachusetts	47	19
Michigan	138	116
Minnesota	394	331
Mississippi	2	
Missouri	53	57
Montana	40	36
Nebraska	68	44
Nevada		
New Hampshire	8	8
New Jersey	4	5
New Mexico	3	5
New York	55	54
Ohio	52	39
Oklahoma	22	13
Oregon	19	24
Pennsylvania	58	35
Rhode Island	7	6
Tennessee	6	6
Texas	16	14
Utah	5	6
Vermont	12	7
Virginia	9	8
Virginia, West	4	7
Washington	67	47
Wisconsin	146	111
Wyoming	3	3
Total	2,435	1,751

SESSIONAL PAPER No. 25

M.—STATEMENT showing the number of Homestead Entries made during the fiscal year ended March 31, 1917, the Nationality of the Homesteaders and the Provinces in which the entries were made.

Nationalities.	PROVINCES.				Total.
	Manitoba.	Saskatchewan.	Alberta.	British Columbia.	
Canadians from Ontario	200	679	600	21	1,500
" Quebec	61	188	236	11	496
" Nova Scotia	9	41	68	6	124
" New Brunswick	5	26	37	2	70
" Prince Edward Island	5	11	35		51
" Manitoba	483	97	73	4	657
" Saskatchewan	10	241	33		284
" Alberta	4	7	222		233
" British Columbia	3	3	35	27	68
Persons who had previous entry	297	512	807	26	1,642
Newfoundlanders		2	2		4
Canadians returned from the United States		4	13		17
Americans	131	740	840	23	1,734
English	372	484	539	74	1,469
Scotch	128	155	199	14	496
Irish	62	49	78	5	194
French	16	13	35	1	65
Belgians	16	15	15		46
Swiss	3	9	18		30
Italians	4	8	25	11	48
Roumanians	3	18	2	1	24
Syrians	1	3	1		5
Germans	9	32	34		75
Austro-Hungarians	243	276	204	12	735
Hollanders	8	13	20		41
Danes (other than Icelanders)	6	19	32		57
Icelanders	25	6	5		36
Swedes	43	98	79	15	235
Norwegians	25	84	111	6	226
Russians (other than Finns)	92	239	149	9	489
Finns	1	6	1	1	9
Servians	1		1		2
Bulgarians		1	1		2
Chinese					
Japanese		2	1		3
Persians					
Australians	1	2	7		10
New Zealanders					
Hindoos	2		1		3
Greeks	1				1
Jamaicans	2		1		3
Poles	3	3	1		7
Spanish	1	2			3
Portuguese			1	1	1
Armenians		1			1
N. Africans		1			1
S. Africans		2			2
Total	2,276	4,092	4,561	270	11,199

Number of souls represented by the above entries..... 25,791

N.—STATEMENT showing the number of Homestead Entries made in the Provinces of Manitoba, Saskatchewan, Alberta and British Columbia during the fiscal year ended March 31, 1917, by persons coming from the United States of America.

States.	Provinces.				Total.
	Manitoba.	Saskatchewan.	Alberta.	British Columbia.	
Alabama		2	3		5
Alaska					
Arizona					
Arkansas			2		2
California		1	8	2	11
Carolina, North		1	4	1	6
Carolina, South					
Colorado		5	7	2	14
Columbia, District of					
Connecticut			2		2
Dakota, North	47	130	109		286
Dakota, South	6	44	42	1	93
Delaware					
Florida					
Georgia			2		2
Idaho		3	13		16
Illinois	9	49	52		110
Indiana	3	13	18		34
Indian Territory					
Iowa	5	44	47	1	107
Kansas		8	28		37
Kentucky		1	7		8
Louisana		1	2		3
Maine		6	6		12
Maryland		2			2
Massachusetts	1	6	11	1	19
Michigan	12	52	52		116
Minnesota	35	176	117	3	331
Mississippi					
Missouri	2	22	32	1	57
Montana		16	20		36
Nebraska	2	13	27	2	44
Nevada					
New Hampshire		2	6		8
New Jersey			5		5
New Mexico		3	2		5
New York	7	21	26		54
Ohio		17	22		39
Oklahoma		5	7		13
Oregon		4	20		24
Pennsylvania	1	11	19	4	35
Rhode Island		3	3		6
Tennessee		1	5		6
Texas		4	9		14
Utah		4	6	1	6
Vermont			3		7
Virginia		3	5		8
Virginia, West		2	5		7
Washington		4	39	4	47
Wisconsin		53	58		111
Wyoming		1	2		3
Total	131	744	853	23	1,751

SESSIONAL PAPER No. 25

O.—STATEMENT showing the number of Homestead Entries reported in each year since 1874.

Departmental Year Ended—	Number of Entries
October 31, 1874	1,376
" 31, 1875	499
" 31, 1876	347
" 31, 1877	845
" 31, 1878	1,788
" 31, 1879	4,068
" 31, 1880	2,074
" 31, 1881	2,753
" 31, 1882	7,483
" 31, 1883	6,063
" 31, 1884	3,753
" 31, 1885	1,858
" 31, 1886	2,657
" 31, 1887	2,036
" 31, 1888	2,655
" 31, 1889	4,416
" 31, 1890	2,955
" 31, 1891	3,523
" 31, 1892	4,840
" 31, 1893	4,067
" 31, 1894	3,209
December 31, 1895	2,394
" 31, 1896	1,857
" 31, 1897	2,384
" 31, 1898	4,848
" 31, 1899	6,689
June 30, 1900	7,426
" 30, 1901	8,167
" 30, 1902	14,673
" 30, 1903	31,383
" 30, 1904	26,073
" 30, 1905	30,819
" 30, 1906	41,869
Nine months ended March 31, 1907	21,647
Year ended March 31, 1908	30,424
" " 31, 1909	39,081
" " 31, 1910	41,568
" " 31, 1911	44,479
" " 31, 1912	39,151
" " 31, 1913	33,699
" " 31, 1914	31,829
" " 31, 1915	24,088
" " 31, 1916	17,030
" " 31, 1917	11,199

P.—STATEMENT showing the number of Pre-emption and Purchased Homestead Entries granted in each Land Agency during the fiscal year 1916-17.

——	Pre-emptions.	Purchased Homesteads
Agency.		
Battleford	23	18
Calgary	155	34
Dauphin	.....	.....
Edmonton	4	3
Grand Prairie	.....	.....
High Prairie	.....	.....
Humboldt	.....	.....
Kamloops	.....	.....
Lethbridge	33	10
Maple Creek	341	32
Medicine Hat	231	38
Moose Jaw	230	26
New Westminster	.....	.....
Peace River	.....	.....
Prince Albert	1	1
Red Deer	29	21
Revelstoke	.....	.....
Saskatoon	83	43
Swift Current	245	30
Weyburn	85	6
Winnipeg	.....	.....
Yorkton	.....	.....
Total	1,460	262
Provinces.		
Saskatchewan	1,008	156
Alberta	452	106
Total	1,460	262

Q.—STATEMENT showing the number of Homestead, Pre-emption and Purchased Homestead Entries granted in each month during the fiscal year 1916-17.

——	Homestead	Pre-emption.	Purchased Homesteads
1916.			
April	1,018	96	15
May	1,474	190	20
June	1,459	212	47
July	1,398	170	35
August	1,084	154	27
September	1,035	135	22
October	834	142	22
November	858	94	20
December	727	95	17
1917.			
January	455	64	11
February	332	49	11
March	525	59	15
Total	11,199	1,460	262

SESSIONAL PAPER No. 25

R.—STATEMENT of Entries affecting Dominion Lands which were made at Head Office during the year ended March 31, 1917.

——	No. of Grants.	Acres.
Special Grants	103	4,521
Calgary and Edmonton Railway Co		29,966 33
Canadian Northern Railway Co		9,099 00
Manitoba and South-Eastern Railway Co		910 35
Qu'Appelle, Long Lake and Saskatchewan Railroad apd Steamboat Co		40,800 21
Alberta and Great Waterways Railway right of way		13 13
Area granted to the Edmonton, Dunvegan and British Columbia Railway right of way		236 58
Area granted to the Grand Trunk Railway Co., for right of way purposes		323 31
Railway right of way	109	3,351 06
Hudson's Bay Company Grants	34	20,792 00

S.—COMPARATIVE STATEMENT of the Homestead Entries and sales made during the fiscal years ending March 31, 1916, and March 31, 1917, respectively.

——	FISCAL YEAR ENDING 31ST MARCH, 1916.		FISCAL YEAR ENDING 31ST MARCH, 1917.	
	No. of entries.	Acres.	No. of entries.	Acres.
Homesteads	17,030	2,724,800	11,199	1,791,840
Sales	453	13,472	389	27,074

T.—STATEMENT showing the number of Assignments recorded in the Land Patents Branch during the fiscal year ended March 31, 1917.

Number of deeds registered	88
Fees received in connection therewith	$175 50

U.—Statement of Land Entries cancelled during the fiscal year ended March 31, 1917.

Year in which Entry was made.	Manitoba.									Total.	Saskatchewan.												Total.
	Homesteads.			Pre-Emptions.			Sales.				Homesteads.			Pre-Emptions.			Purchased Homesteads.			Sales.			
	Cause of Cancellation.										Cause of Cancellation.												
	Abandonment.	Default.	Error, etc.	Abandonment.	Default.	Error, etc.	Abandonment.	Default.	Error, etc.		Abandonment.	Default.	Error, etc.	Abandonment.	Default.	Error, etc.	Abandonment.	Default.	Error, etc.	Abandonment.	Default.	Error, etc.	
1917	2									2	2												2
1916	157	54	5							216	246	79	5	41	9	2	4		2				388
1915	363	234	2							599	560	427	7	93	70	2	16	4			1		1,180
1914	165	188								353	328	510	2	79	119		3	4					1,045
1913	59	83	1						1	144	202	436	1	80	145		5	1	1				871
1912	32	48	1							81	85	259	2	57	79	2	1	9			2		496
1911	27	25					1			53	46	102		40	70		6	2	1		1		268
1910	16	15						1		32	25	74		25	97		4	2			1		228
1909	7	20								27	14	32	4	13	36								99
1908	11	10								21	6	26		9	24						1		66
1907	4	11								15	1	16											17
1906	1	14					1	4		20	6	22											28
1905	2	3								5	1	11											12
1904		4						1		5		1											1
1903	2	3								5													
1899		2								2													
1897	1									1													
1896		1								1													
1894		2								2													
1892	1	1								2													
1884																							
1880		1								1													
Totals	850	719	9				2	6	1	1,587	1,522	1,995	21	437	649	6	39	22	4		6		4,701

U.—Statement of Land Entries cancelled during the fiscal year ended March 31, 1917—*Concluded.*

Year in which Entry was made.	Alberta.												Total.	British Columbia.						Total.	Grand Totals
	Homesteads.			Pre-Emptions.			Purchased Homesteads.			Sales.				Homesteads.			Sales.				
	Cause of Cancellation.													Cause of Cancellation.							
	Abandonment.	Default.	Error, etc.	Abandonment.	Default.	Error, etc.	Abandonment.	Default.	Error, etc.	Abandonment.	Default.	Error, etc.		Abandonment.	Default.	Error, etc.	Abandonment.	Default.	Error, etc.		
1917	1												1								5
1916	397	164	21	13	3		3	2		1			604	29	23	1				53	1,261
1915	737	461	10	34	24		4	3		1			1,273	54	56					110	3,162
1914	467	595	1	32	52		3	3		2			1,155	31	43					74	2,627
1913	215	372	1	30	62		1	3		1			685	20	45	1				66	1,766
1912	96	167	3	25	76		2	1			1		371	6	7					13	961
1911	59	112		20	93		3	1					288	1	7			1		9	618
1910	21	77		10	95			2					205	1	3					4	469
1909	14	37		3	62		1	1			2	1	121		1					1	248
1908	6	18		4	17		1						46								133
1907	4	14											18		1					1	51
1906	1	9											10					1		1	59
1905	2	5											7		2					2	26
1904	2	3											5		1					1	12
1903		6											6								11
1899																					2
1897																					1
1896																					1
1894		1											1								3
1892																					2
1884		2											2								2
1880																					1
Totals	2,022	2,043	36	171	484		18	15		5	3	1	4,798	142	189	2		2		335	11,421

REPORT OF THE ORDNANCE AND ADMIRALTY LANDS BRANCH.

During the period embraced by this report there were no public sales of Ordnance lands held, but, with respect to the land formerly sold or occupied under lease, with the option of purchase, ten parcels, or lots, situated in the various localities hereunder mentioned, and in the annexed statement marked A, have been fully paid and letters patent issued therefor.

1. *Grand Falls, N.B.*—Three farm lots, forming part of the reserve adjacent to this town, which were sold at public auction in 1901 and 1902 for the sum of $120, have been paid in full and letters patent issued. The balance of the purchase money received within the last fiscal year was $49.50.

2. *Ottawa.*—Ordnance lands in this locality are occupied by tenants under leases originally granted by the Imperial authorities, in which it is provided that the lessee may, upon payment in cash of the purchase price in full for the land occupied, convert his leasehold into freehold and obtain the Crown patent. Of these parcels, or lots, four whole and two half lots were redeemed in full and letters patent issued. The total consideration money received for said parcels amounted to $933.32.

3. *Port Maitland, Ont.*—The reserve herein referred to is situated on the west side of the Grand river in the township of Dunn, county of Haldimand, and contains an area of about seventy-five acres. The whole reserve had been occupied by squatters for upwards of fifty years, many of whom have made valuable improvements on their holdings.

In order to deal equitably with these squatters, and at the same time protect the interest of the Crown, it was considered advisable to have a subdivision survey made, which was accordingly done, and the property subdivided into thirty-nine parcels or holdings. Council was asked for and granted the necessary authority to sell the land, at a valuation, to the parties in possession, or grant leases for a period of years on payment of a rental, based on the valuation of the land, to those desirous of leasing their holdings, with the privilege of paying the purchase price in full at any time and obtaining letters patent for the land. During the past fiscal year one of the squatters took advantage of the privilege granted, paid the purchase money in full for his holding, and obtained letters patent. The purchase money received was $60.42.

The following statements are hereto annexed:—

A. Statement giving the number of lots and part lots sold or redeemed, the original purchase price, and the sums received within the year as instalments or balance of purchase money.

B. Statement giving the several localities where Ordnance lands are situated, on account of which moneys have been received during the fiscal year.

C.—Statement of the receipts each month of the fiscal year, classified as fees, rent or interest, equivalent to rent and principal.

D.—Statement showing the amounts due and unpaid on account of purchase money and rent or interest. The total amount shown to be outstanding, at the close of the fiscal year, was $4,510.60, being $1,087.83 less than last year.

The correspondence and office work in general averages about the same as the previous years. The number of letters received, recorded and filed 342; number written, copied, indexed and mailed, 506; and in addition 89 reports on various matters relating to ordnance lands were prepared and submitted. There were 76 receipts issued, 2 leases prepared and recorded, 7 draft letters patent prepared, and 15 assignments received, examined and registered.

The accounts open in the books of this branch have been regularly and carefully posted; the cash book, receipt book and monthly statement book have been diligently kept, and a monthly return of all moneys received regularly prepared and forwarded to the accounts branch.

I beg to supplement the foregoing report by a brief synopsis of the work performed in connection with the Orders in Council passed from time to time relating to the administration of this department in its numerous and varied branches.

During the past year there were 638 Orders in Council passed, all of which were carefully recorded, copied, compared, printed and filed, so that copies thereof may be available at all times. There were 230 requisitions prepared and issued; 148 Orders in Council published in the *Canada Gazette* in compliance with the regulations in that behalf, and of this number 16 were also published in the British Columbia *Gazette*.

Two additional bound volumes of Orders in Council, covering the years 1911 and 1912, were completed and distributed among the various branches of the department for convenience of reference and as a permanent office record.

The extent and importance of the work performed in this branch in connection with the record of attendance of the officials in the numerous branches of this department may be readily estimated, when attention is drawn to the fact that this record comprises absences for any and all reasons and forms the basis of the monthly pay-lists and of the quarterly return furnished in accordance with the provisions of the Civil Service Amendment Act, 1908.

JOS. P. DUNNE,
Superintendent of Ordnance and Admiralty Lands Branch.

A.—STATEMENT giving the number of lots and part lots sold or redeemed, the amounts for which such lots were originally disposed of and the sum received as instalment, or balance of purchase money, during the fiscal year ending March 31, 1917.

Locality.	Number of lots sold or redeemed.	Amount of consideration of purchase money.	Amt. received on account during Fiscal Year.	Remarks.
		$ cts.	$ cts.	
Ottawa	4 whole lots	733 32	733 32	Purchase money in full.
	2 half lots	200 00	200 00	" "
Grand Falls	3 farm lots	120 00	49 50	Balance purchase money.
Port Maitland	1 lot	60 42	60 42	Purchase money in full.
		1,113 74	1,043 24	

B.—STATEMENT naming the various localities where Ordnance lands are situated on account of which moneys have been received during the fiscal year ending March 31, 1917.

Locality.	Total.
	$ cts.
Amherstburg	2 00
Burlington Beach	580 00
Carillon	0 20
Edmundston	1 00
Elmsley	9 20
Fort Cumberland	64 00
Fort Erie	3 00
Grand Falls	94 56
Kingston	203 25
Montague	4 00
Nepean	4 00
Ottawa	3,043 25
Owen Sound	75 25
Oxford	1 20
Point Edward	461 25
Point Pelee	63 38
Port Maitland	68 22
Prescott	1 00
Quebec	830 00
St. Joseph Island	4 50
Shelbourne	6 00
South Crosby	2 00
	5,521 26
Fees	32 00
	5,553 26

C.—STATEMENT showing the receipts each month of the year, classified as fees, rent, or interest, equivalent to rent and principal.

Month.	Fees.	Interest.	Principal.	Total.
	$ cts.	$ cts.	$ cts.	$ cts.
April		270 40		270 40
May		557 70		557 70
June	6 00	224 95	110 00	340 95
July		1,004 40		1,004 40
August	4 00	276 24	49 50	329 74
September	8 00	681 95	240 00	929 95
October		15 00		15 00
November		826 57	333 74	1,160 31
December	2 00	10 68	90 00	102 68
1917.				
January		300 03		300 03
February	4 00	299 80	220 00	523 80
March	8 00	10 30		18 30
	32 00	4,478 02	1,043 24	5,553 26

SESSIONAL PAPER No. 25

D.—STATEMENT showing amounts due and unpaid on account of purchase money, and rent or interest, for the year ending March 31, 1917.

Locality.	Rest or Interest.	Principal.	Total.
	$ cts.	$ cts.	$ cts.
Beaver Harbour	4 00		4 00
Burlington Beach	100 00		100 00
Chambly	323 20	152 00	475 20
Dalhousie	22 08	23 00	45 08
Elmsley	1 00		1 00
Grand Falls	215 79	457 68	673 47
Grenville	2 60		2 60
Marlborough	9 00		9 00
Nepean	69 00		69 00
Niagara	177 25	507 00	684 25
Oromocto	0 25		0 25
Ottawa	1,192 57		1,192 57
Owen Sound	14 00		14 00
Oxford	27 50		27 50
Prescott	1 00		1 00
Presquisle	3 50		3 50
Queenston	1 00		1 00
St. Croix River	10 00		10 00
St. Joseph's Island	386 42		386 42
Sorel	69 36		69 36
Tay	32 00		32 00
Wolford	709 40		709 40
	3,370 92	1,139 68	4,510 60

CORRESPONDENCE REGISTRATION BRANCH.

Statement A shows the number of letters and documents recorded during the year.

Statement B shows the growth of the work, year by year, for the past eighteen years.

298,565 letters and documents were received and dealt with and 179,139 were numbered and recorded.

Upwards of a million and a half fyles were distributed to the several branches, and at present there are 10,000 fyles being acted on, or awaiting action, throughout the department.

1,642 telegrams were received and registered.

1,579 letters written in French, Ruthenian, German, Russian, Norwegian, Polish, Bohemian, Danish, Dutch, Roumanian, Icelandic, and Swedish were translated into English.

A.—STATEMENT showing the number of Letters and Documents recorded during the fiscal year ended March 31, 1917.

	Letters Recorded.	Daily Average.	Registered Letters.	
			Received.	Sent.
1916.				
April	26,355	1,146	2,267	1,554
May	15,977	615	2,614	2,224
June	14,552	606	2,494	1,741
July	14,244	570	2,613	1,974
August	13,441	517	2,448	2,330
September	12,903	516	2,255	3,522
October	11,111	444	2,468	2,892
November	11,024	441	2,431	2,594
December	10,021	436	2,293	2,264
1917.				
January	15,183	563	2,642	2,806
February	14,336	623	2,448	2,163
March	19,992	740	2,587	2,073
Total	179,139		29,648	28,137

B.—STATEMENT showing the number of Letters and Documents recorded during each fiscal year from 1900 to March 31, 1917.

Fiscal Year.	Letters Recorded.
1900	48,663
1901	67,860
1902	67,722
1903	87,851
1904	113,074
1905	135,908
1906	176,729
1907 nne months)	150,462
1908	187,684
1909	260,142
1910	264,209
1911	279,186
1912	272,419
1913	255,105
1914	238,463
1915	221,624
1916	337,176
1917	179,139

J. M. ROBERTS,
Chief of Branch.

SESSIONAL PAPER No. 25

STATEMENT of the work done in the Correspondence Comparing and Mailing Branch during the fiscal year ended March 31, 1917.

From April 1, 1916, to March 31, 1917.	Letters sent.	Registered letters sent.	Telegrams sent.	Totals.
1916.				
April	33,836	1,554	224	35,614
May	43,174	2,224	156	45,554
June	34,400	1,741	177	36,318
July	38,485	1,974	145	40,604
August	34,190	2,330	169	36,689
September	46,798	3,522	100	50,420
October	43,179	2,892	70	46,141
November	39,492	2,594	115	42,201
December	35,233	2,264	85	37,582
1917.				
January	41,460	2,806	80	44,346
February	38,180	2,163	186	40,529
March	43,565	2,073	91	45,729
Total for fiscal year ending March 31, 1917	471,992	28,137	1,598	501,727

The out-going letters were copied in 168 one-thousand paged letter-books.

The number of pages of letter-books indexed was 160,890.

The daily average of letters sent out was 1,565.

The heaviest average was during the month of September, 1916, the daily average being 1,873. The lightest month was August, 1916, with an average of 1,304.

There were 2,000 documents compared.

The grand total of out-going correspondence from this office, during the fiscal year 1916-17, was 501,727, over half a million letters, an increase of 96,492 letters over the fiscal year 1915-16, or 24 per cent.

There were 23 circulars sent out to the Dominion lands agents and sub-agents.

CHAS. C. PELLETIER,

Clerk in Charge,

Correspondence Comparing and Mailing Branch.

PART II

IMMIGRATION

IMMIGRATION

REPORT OF THE SUPERINTENDENT OF IMMIGRATION.

Summary for the Fiscal Year 1916-17.

For ocean travel—			
Quebec		6,408	
St. John		1,636	
North Sydney		1,032	
Victoria		727	
Halifax		497	
Vancouver		456	
New York	3,017		
Boston	176		
Portland	36	3,229	13,985
From the United States			61,389
Total			75,374

Comparative Statement.—Immigration to Canada, via Ocean Ports, by months, for the Fiscal Year 1916-17, compared with that of the Fiscal Year 1915-16.

	1915-16.				1916-17.			
	Males.	Females.	Children.	Totals.	Males.	Females.	Children.	Totals.
April	543	617	317	1,477	354	557	269	1,180
May	559	908	509	1,976	347	671	314	1,332
June	311	674	454	1,439	402	798	495	1,695
July	285	486	281	1,052	387	759	377	1,523
August	317	584	302	1,203	379	734	312	1,425
September	208	435	351	994	356	883	363	1,602
October	229	544	263	1,036	471	814	364	1,649
November	137	346	182	665	378	833	313	1,524
December	97	195	96	388	264	385	186	835
January	80	166	81	327	134	247	123	504
February	130	210	63	403	119	160	77	356
March	193	322	125	640	180	125	55	360
Totals	3,089	5,487	3,024	11,600	3,771	6,966	3,248	13,985

COMPARATIVE STATEMENT.—Immigration from the United States to Canada, by months, for the Fiscal Year 1916-17, compared with that of the Fiscal Year 1915-16.

	1915-16.				1916-17.			
	Males.	Females.	Children.	Totals.	Males.	Females.	Children.	Totals.
April	2,282	1,191	927	4,400	3,400	1,209	1,087	5,696
May	1,678	1,038	761	3,477	2,671	1,116	796	4,583
June	1,467	1,082	610	3,159	2,315	1,130	703	4,148
July	1,364	905	527	2,796	2,617	1,066	767	4,450
August	2,255	858	579	3,692	4,244	1,077	738	6,059
September	1,817	661	431	2,909	4,222	1,105	693	6,020
October	1,548	755	601	2,904	2,848	1,085	861	4,794
November	1,379	665	462	2,506	2,295	851	686	3,832
December	1,092	617	436	2,145	1,832	790	548	3,170
January	937	464	250	1,651	2,921	672	415	4,008
February	1,167	623	374	2,164	2,513	717	541	3,771
March	3,064	1,132	938	5,134	7,425	1,753	1,680	10,858
Totals	20,050	9,991	6,896	36,937	39,303	12,571	9,515	61,389

COMPARATIVE STATEMENT.—Total Immigration to Canada, by months, for the Fiscal Year 1916-17, compared with that of the Fiscal Year 1915-16.

	1915-16.				1916-17.			
	Males.	Females.	Children.	Totals.	Males.	Females.	Children.	Totals.
April	2,825	1,808	1,244	5,877	3,754	1,766	1,356	6,876
May	2,237	1,946	1,270	5,453	3,018	1,787	1,110	5,915
June	1,778	1,756	1,064	4,598	2,717	1,928	1,198	5,843
July	1,649	1,391	808	3,848	3,004	1 825	1.144	5,973
August	2,572	1,442	881	4,895	4,623	1,811	1,050	7,484
September	2,025	1,096	782	3,903	4,578	1,988	1,056	7,622
October	1,777	1,299	864	3,940	3,319	1,899	1,225	6,443
November	1,516	1,011	644	3,171	2,673	1,684	999	5,356
December	1,189	812	532	2,533	2,096	1,175	734	4,005
January	1,017	630	331	1,978	3,055	919	538	4,512
February	1,297	833	437	2,567	2,632	877	618	4,127
March	3,257	1,454	1,063	5,774	7,605	1,878	1,735	11,218
Totals	23,139	15,478	9,920	48,537	43,074	19,537	12,763	75,374

COMPARATIVE STATEMENT.—Total Immigration to Canada, by Ports, for the Fiscal Year 1916-17, compared with that of the Fiscal Year 1915-16.

	1915-16.				1916-17.			
	Males.	Females.	Children.	Totals.	Males.	Females.	Children,	Totals.
Quebec	1,319	3,048	1,801	6,168	930	3,824	1,654	6,408
St. John	362	759	318	1,439	565	763	308	1,636
Halifax	204	319	229	752	150	249	98	497
Victoria	191	254	52	497	336	317	74	727
North Sydney	104	42	56	202	341	391	300	1,032
Vancouver	60	43	21	124	303	90	63	456
United States ports—New York, Boston and Portland	849	1,022	547	2,418	1,146	1,332	751	3,229
From the United States	20,050	9,991	6,896	36,937	39,303	12,571	9,515	61,389
Totals	23,139	15,478	9,920	48,537	43,074	19,537	12,763	75,374

Sex, Occupation and Destination of Total Immigrant Arrivals in Canada, for the Fiscal Year ended March 31, 1917.

	Sex.				Trade or Occupation.											
					Farmers and Farm Labourers.			General Labourers.			Mechanics.			Clerks, Traders, etc.		
	Males.	Females.	Children.	Totals.	Males.	Females.	Children.	Males.	Females.	Children.	Males.	Females.	Children.	Males.	Females.	Children.
Via Ocean Ports	3,771	6,966	3,248	13,985	867	584	442	1,409	257	218	694	881	475	271	337	95
From the United States	39,303	12,571	9,515	61,389	14,335	2,832	3,655	7,774	815	678	11,734	1,923	1,247	1,784	557	291
Totals	43,074	19,537	12,763	75,374	15,202	3,416	4,097	9,183	1,072	896	12,428	2.804	1,722	2,055	894	386

	Trade or Occupation.							Destination.							
	Miners.			Female Servants.	Not Classified.			Maritime Provinces.	Quebec.	Ontario.	Manitoba.	Saskatchewan.	Alberta.	British Columbia.	Yukon Territory.
	Males.	Females.	Children.		Males.	Females.	Children.								
Via Ocean Ports	32	18	38	2,639	498	2,250	1,980	1,668	2,432	4,928	1,197	1,219	1,034	1,505	2
From the United States	733	37	58	1,804	2,943	4,603	3,586	4,042	8,498	21,150	4,050	8,655	11,384	3,297	313
Totals	765	55	96	4,443	3,441	6,853	5,566	5,710	10,930	26,078	5,247	9,874	12,418	4,802	315

COMPARATIVE STATEMENT.—Total Immigration to Canada, by Nationalities, for the Fiscal Year 1916-17, compared with that of the Fiscal Year 1915-16, showing Increase or Decrease of each Nationality.

——	1915-16.	1916-17.	Increase.	Decrease.
English	5,857	5,174		683
Irish	818	958	140	
Scotch	1,887	2,062	175	
Welsh	102	88		14
Total British	8,664	8,282		382
African, South	11	1		10
Australian	32	18		14
Austro-Hungarian—				
Austrian	15			15
Ruthenian		1	1	
Belgian	172	126		46
Bermudian		16	16	
Brazilian	2			2
Bulgarian	1			1
Chinese	88	393	305	
Cuban	1	3	2	
Dutch	186	151		35
French	180	199	19	
German	27	9		18
Greek	145	258	113	
Hawaiian	1			1
Hebrew—				
Hebrew, N.E.S	18	28	10	
" Austrian	1			1
" Russian	46	108	62	
Hindoo	1			1
Italian	388	758	370	
Jamaican	9	6		3
Japanese	401	648	247	
Maltese	4	109	105	
Montenegrin		1	1	
Negro	34	98	64	
Newfoundland	255	1,243	988	
New Zealand	18	12		6
Persian	3			3
Polish—				
Polish, N.E.S	1	1		
" Austrian		8	8	
" Russian	7	3		4
Portuguese		1	1	
Roumanian	4	4		
Russian—				
Russian, N.E.S	40	25		15
Finnish	139	249	110	
Scandinavian—				
Danish	167	145		22
Icelandic	15	9		6
Norwegian	232	303	71	
Swedish	177	332	155	
Serbian	6	1		5
Spanish	11	76	65	
Swiss	42	30		12
Turkish—				
Turkish, N.E.S		5	5	
Armenian		3	3	
Syrian	3	9	6	
U.S.A. Citizens, via ocean ports	15	20	5	
West Indian	38	293	255	
Total Continental, etc	2,936	5,703	2,767	
From the United States	36,937	61,389	24,452	
Total immigration	48,537	75,374	26,837	

ARRIVALS AT OCEAN PORTS.

For the fiscal year 1916-17, there arrived, via Canadian and United States ocean ports, 70,820 passengers, of whom 13,935 travelled saloon, and 56,885 steerage. Of the saloon passengers, 10,183 were destined to Canada, and 3,752 to the United States. Of the steerage passengers, 53,048 were for Canada and 3,837 for the United States. Included in the steerage passengers for Canada were 27,795 returned Canadians and 11,268 tourists, leaving the immigration proper at 13,985 souls, which, together with the 61,389 settlers from the United States, brings the total immigration to 75,374, an increase as compared with that of the preceding fiscal year of 26,837 persons.

The following further statistical information will be of interest: table I deals with the total arrivals of saloon passengers; table II with the total arrivals of steerage passengers; table III with the monthly arrivals of immigrants for Canada; and tables IV and V give summaries of the information obtained from immigrants for Canada upon arrival.

TABLE I.—Nationality and Sex of Saloon Passengers arriving at Ocean Ports, for the Fiscal Year ended March 31, 1917.

	Canada.				United States.				Canada and United States.			
	Males.	Females.	Children.	Totals.	Males.	Females.	Children.	Totals.	Males.	Females.	Children.	Totals.
African, South		1		1						1		1
Australian	2	2	3	7	16	16	5	37	18	18	8	44
Austrian					2			2	2			2
Belgian	2	3	1	6	2			2	4	3	1	8
Bermudian	1	8	3	12					1	8	3	12
Corean						1		1		1		1
Cuban	5	6	1	12					5	6	1	12
Dutch	4	3	4	11	13	4	4	21	17	7	8	32
French	10	5		15	8	10	2	20	18	15	2	35
German					11	2	6	19	11	2	6	19
Great Britain aud Ireland—												
English	122	137	49	308	121	71	23	215	243	208	72	523
Irish	12	18	2	32	19	9	6	34	31	27	8	66
Scotch	22	10	10	42	33	14	3	50	55	24	13	92
Welsh	2			2	3		2	5	5		2	7
Greek	4	9	3	16	3			3	7	9	3	19
Hebrew—												
Hebrew, N.E.S.		1		1	6	2	1	9	6	3	1	10
" Russian	1			1	1	2	1	4	2	2	1	5
Hindoo					1			1	1			1
Italian	4	4	3	11	3			3	7	4	3	14
Jamaican	24	33	3	60					24	33	3	60
Japanese	1	2		3	46	6	1	53	47	8	1	56
Mexican	4	7	3	14	2	1		3	6	8	3	17
Negro	15	14		29					15	14		29
Newfoundland	100	141	64	305	232	311	68	611	332	452	132	916
New Zealand	3			3	7	3		10	10	3		13
Polish—												
Polish, N.E.S.					2	2	1	5	2	2	1	5
" Russian					2			2	2			2
Portuguese	1	2		3	3	3		6	4	5		9
Roumanian		2		2	1			1	1	2		3
Russian—												
Russian, N.E.S.	3	3	1	7	30	15	6	51	33	18	7	58
Finnish					1			1	1			1
Scandinavian—												
Danish	4	5	3	12	6	3	2	11	10	8	5	23
Icelandic		1		1						1		1
Norwegian	1	3		4	14	1		15	15	4		19
Swedish	5	1		6	6	4		10	11	5		16
Spanish	10	4	1	15	5			5	15	4	1	20
Swiss	1	2		3	2	2		4	3	4		7
Turkish—												
Turkish, N.E.S.					3			3	3			3
Armenian					2			2	2			2
Egyptian					1			1	1			1
Syrian	1			1	3			3	4			4
U.S.A. Citizens	13	8	3	24	1,212	987	276	2,475	1,225	995	279	2,499
West Indian	38	57	16	111		1		1	38	58	16	112
Returned Canadian	2,426	1,831	516	4,773					2,426	1,831	516	4,773
Tourist	2,403	1,566	361	4,330	35	15	3	53	2,438	1,581	364	4,383
Totals	5,244	3,889	1,050	10,183	1,857	1,485	410	3,752	7,101	5,374	1,460	13,935

SESSIONAL PAPER No. 25

TABLE II.—Nationality and Sex of Steerage Passengers arriving at Ocean Ports, for the Fiscal Year ended March 31, 1917.

—	Canada.				United States.				Canada and United States.			
	Males.	Females.	Children.	Totals.	Males.	Females.	Children.	Totals.	Males.	Females.	Children.	Totals.
African, South	1			1					1			1
Australian	5	8	5	18	43	46	17	106	48	54	22	124
Austro-Hungarian—												
Austrian, N.E.S.						1	1	2		1	1	2
Bohemian					1	1		2	1	1		2
Ruthenian		1		1						1		1
Belgian	16	51	59	126					16	51	59	126
Bermudian		10	6	16						10	6	16
Chilian					1			1	1			1
Chinese	297	33	63	393					297	33	63	393
Corean					1	1		2	1	1		2
Cuban	1	1	1	3	1			1	2	1	1	4
Dutch	73	50	28	151	10			10	83	50	28	161
French	52	110	37	199	5	3		8	57	113	37	207
German	1	7	1	9	1	4		5	2	11	1	14
Great Britain and Ireland—												
English	772	3.044	1,358	5,174	134	177	97	408	906	3,221	1,455	5,582
Irish	160	632	166	958	25	42	5	72	185	674	171	1,030
Scotch	272	1,255	535	2,062	43	70	28	141	315	1,325	563	2.203
Welsh	8	62	18	88	3	1	3	7	11	63	21	95
Greek	197	32	29	258	11	2		13	208	34	29	271
Hebrew—												
Hebrew, N.E.S.	12	6	10	28	1			1	13	6	10	29
" Russian	11	48	49	108	8	37	33	78	19	85	82	186
Hindoo					5			5	5			5
Italian	248	292	218	758	3			3	251	292	218	761
Jamaican	5	1		6					5	1		6
Japanese	301	310	37	648	42	8		50	343	318	37	698
Maltese	99	6	4	109					99	6	4	109
Mexican					4			4	4			4
Montenegrin	1			1					1			1
Negro	82	14	2	98					82	14	2	98
Newfoundland	451	483	309	1,243	703	479	194	1,376	1,154	962	503	2,619
New Zealand	3	5	4	12	8	13	10	31	11	18	14	43
Polish—												
Polish, N.E.S.		1		1						1		1
" Austrian		8		8						8		8
" Russian	2	1		3	1	2	2	5	3	3	2	8
Portuguese	1			1	3	2	1	6	4	2	1	7
Roumanian		4		4						4		4
Russian—												
Russian, N.E.S	11	8	6	25	51	70	51	172	62	78	57	197
Finnish	41	125	83	249	5	4		9	46	129	83	258
Scandinavian—												
Danish	87	37	21	145	13		3	16	100	37	24	161
Icelandic	6	3		9					6	3		9
Norwegian	98	128	77	303	58	7	10	75	156	135	87	378
Swedish	128	118	86	332	34	4	2	40	162	122	88	372
Serbian	1			1					1			1
Spanish	50	12	14	76	42	5	2	49	92	17	16	125
Swiss	18	11	1	30	5			5	23	11	1	35
Turkish—												
Turkish, N.E.S.	3	1	1	5					3	1	1	5
Armenian	2	1		3	1			1	3	1		4
Syrian	1	7	1	9	1			1	2	7	1	10
U.S.A. Citizens	8	9	3	20	466	156	73	695	474	165	76	715
West Indian	246	31	16	293	2	2	3	7	248	33	19	300
Total immigration	3,771	6,966	3,248	13,985	1,735	1,137	535	3,407	5,506	8,103	3,783	17,392
Returned Canadian	19,142	5,685	2,968	27,795					19,142	5,685	2,968	27,795
Tourist	9,905	1,037	326	11,268	391	27	12	430	10,296	1,064	338	11,698
Totals	32,818	13,688	6,542	53,048	2,126	1,164	547	3,837	34,944	14,852	7,089	56,885

TABLE III.—Monthly arrivals of Immigrants, for Canada, by Nationalities, at Ocean Ports, for the Fiscal Year ended March 31, 1917.

——	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Totals.
African, South						1							1
Australian	1	1	5	3	2	1	1		3			1	18
Ruthenian	1												1
Belgian		9	20	23	2	8	8	7		49			126
Bermudian	1	13	2										16
Chinese	12	15	13	30	41	34	39	44	69	44	18	34	393
Cuban					3								3
Dutch	15	34	7	6	28	14	20	17	4	4		2	151
French	17	14	14	14	21	37	24	21	6	21	1	9	199
German		1	4	1	2		1						9
Great Britain and Ireland													
English	409	619	771	652	569	558	583	502	226	130	96	59	5,174
Irish	91	49	112	118	111	154	87	142	26	25	28	15	958
Scotch	238	177	241	231	220	336	206	222	99	63	13	16	2,062
Welsh	5	13	10	20	10	17	3	6	3		1		88
Greek	46	38	77	17	19	15	17	4	10	4	11		258
Hebrew—													
Hebrew, N.E.S.		1	9	3	4	2		9					28
" Russian	6	9	4	13	6		12	10	33	1	13	1	108
Italian	61	52	50	36	46	77	85	88	108	50	57	48	758
Jamaican			1	1			1	2			1		6
Japanese	67	70	69	46	36	28	65	55	51	26	46	89	648
Maltese			1	5	25	26	12	10	10	6	3	11	109
Montenegrin			1										1
Negro	4		1	3	2	11	71		1	3		2	98
Newfoundland	77	101	126	71	126	133	175	214	104	20	47	49	1,243
New Zealand	2	1	2				4		3				12
Polish—													
Polish, N.E.S.					1								1
" Austrian		1						4	3				8
" Russian		1	2										3
Portuguese										1			1
Roumanian			2		2								4
Russian—													
Russian, N.E.S.	1		1	8		2	5	2	4			2	25
Finnish	20	19	13	24	21	20	34	41	28	26	3		249
Scandinavian—													
Danish	42	16	17	25	5	9	5	9	3	5	3	6	145
Icelandic						2	6	1					9
Norwegian	23	31	58	47	29	51	35	15	10	1	1	2	303
Swedish	29	21	38	27	33	31	45	59	26	11	12		332
Serbian					1								1
Spanish	9	2	12	1	1	6	11	19	3	6		6	76
Swiss		3	3	12	2	3	4	1			2		30
Turkish—													
Turkish, N.E.S.		3		2									5
Armenian				1			2						3
Syrian								1		8			9
U.S.A. Citizens		2	3	1	6	2	2	2	1			1	20
West Indian	3	16	6	82	51	24	86	17	1			7	293
Totals	1,180	1,332	1,695	1,523	1,425	1,602	1,649	1,524	835	504	356	360	13,985

SESSIONAL PAPER No. 25

TABLE IV.—Monthly arrivals of Immigrants for Canada, by Occupation and Destination, at Ocean Ports, for the Fiscal Year ended March 31, 1917.

	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Totals.
Agriculturists	359	258	266	209	155	156	158	125	90	37	32	48	1,893
General labourers	164	141	174	153	142	171	274	234	206	63	74	88	1,884
Mechanics	153	176	268	271	274	259	304	204	43	40	29	29	2,050
Clerks, traders, etc	59	47	61	108	73	81	63	66	59	39	27	20	703
Miners	14	10	17	4	13	3	7	6	5	1	..	8	88
Female servants	172	257	287	270	266	393	322	398	147	82	32	13	2,639
Not classified	259	443	622	508	502	539	521	491	285	242	162	154	4,728
Totals	1,180	1,332	1,695	1,523	1,425	1,602	1,649	1,524	835	504	356	360	13,985
Maritime Provinces	130	134	230	180	161	119	318	192	57	26	66	55	1,668
Quebec	102	156	251	228	238	366	307	341	206	120	58	59	2,432
Ontario	448	473	584	587	554	595	503	546	272	181	99	86	4,928
Manitoba	125	108	135	109	102	185	121	139	88	47	24	14	1,197
Saskatchewan	170	162	202	145	118	103	136	81	50	22	21	9	1,219
Alberta	74	139	147	138	96	118	107	93	43	35	21	23	1,034
British Columbia	131	160	146	136	156	115	157	132	119	73	66	114	1,505
Yukon Territory	. .	.....	... ..	.....	.. ..	1	...	.....	....	....	1	...	2
Totals	1,180	1,332	1,695	1,523	1,425	1,602	1,649	1,524	835	504	356	360	13,985

TABLE V.—Nationality, Sex, Occupation and Destination of Immigrant

	Sex.				Trade or											
					Farmers and Farm Labourers.			General Labourers.			Mechanics.			Clerks, Traders, etc.		
	Males.	Females.	Children.	Totals.	Males.	Females.	Children.	Males.	Females.	Children.	Males.	Females.	Children.	Males.	Females.	Children.
African, South	1			1												
Australian	5	8	5	18	1						4	1				
Ruthenian		1		1												
Belgian	16	51	59	126	6	5	6	3	1	2	4	5	3		1	
Bermudian		10	6	16								1				
Chinese	297	33	63	393				152						99	16	29
Cuban	1	1	1	3							1	1	1			
Dutch	73	50	28	151	37	15	16	8	2	3	9	3		5	2	1
French	52	110	37	199	10	10	7	5			17	21	5	2	4	
German	1	7	1	9	1				1							
Great Britain and Ireland—																
English	772	3,044	1,358	5,174	288	314	176	78	96	81	179	479	246	53	174	42
Irish	160	632	166	958	42	32	13	22	11	7	34	97	41	22	42	11
Scotch	272	1,255	535	2,062	97	116	123	35	40	27	69	183	114	15	82	10
Welsh	8	62	18	88	2	4		1			2	11	7			
Greek	197	32	29	258	7	1	1	176	9	15	5			2		
Hebrew—																
Hebrew, N.E.S	12	6	10	28	1						6	3	1	1	1	
" Russian	11	48	49	108	1	1	2				6	17	10	1	2	1
Italian	248	292	218	758	39	17	12	173	54	64	20	11	4	8	1	
Jamaican	5	1		6							4			1		
Japanese	301	310	37	648	87	22	2	116	23		9	5		28	6	
Maltese	99	6	4	109	11			68	2	2	18	1	1			
Montenegrin	1			1				1								
Negro	82	14	2	98	2			70			9	2		1		
Newfoundland	451	483	309	1,243	1			304	7	7	104	13	17	9	1	
New Zealand	3	5	4	12			1				2					
Polish—																
Polish, N.E.S		1		1												
" Austrian		8		8												
" Russian	2	1		3	2											
Portuguese	1			1	1											
Roumanian		4		4												
Russian—																
Russian, N.E.S	11	8	6	25	2			1			3	3	5	2	1	
Finnish	41	125	83	249	19	5	4	15	3	2	1	1				
Scandinavian—																
Danish	87	37	21	145	59	8	14	11			9			3		
Icelandic	6	3		9	3			2								
Norwegian	98	128	77	303	51	17	29	17	2	1	13	8	14	3	3	
Swedish	128	118	86	332	75	13	30	21	1	1	24	7	3	1		
Serbian	1			1				1								
Spanish	50	12	14	76	1			39	2	4				5		
Swiss	18	11	1	30	16	3	1	1			1	1				
Turkish—																
Turkish, N.E.S	3	1	1	5				3								
Armenian	2	1		3				2								
Syrian	1	7	1	9				1	3	1						
U.S.A. Citizens	8	9	3	20			1	1						2		
West Indian	246	31	16	293	5	1	14	82		1	141	7	3	8	1	1
Totals	3,771	6,966	3,248	13,985	867	584	442	1,409	257	218	694	881	475	271	337	95

arrivals for Canada, at Ocean Ports, for the Fiscal Year ended March 31, 1917.

Occupation.							Destination.								
Miners.			Female Servants.	Not Classified.			Maritime Provinces.	Quebec.	Ontario.	Manitoba.	Saskatchewan.	Alberta.	British Columbia.	Yukon Territory.
Males.	Females.	Children.		Males.	Females.	Children.								
				1					1					
					7	5		2	5			2	9	
					1					1				
			7	3	32	48	8	59	13	27	6	11	2	
			3		6	6	9	3	4					
				46	17	34	15	187	51	4	4	4	123	
								3						
			6	14	22	8	3	16	24	23	15	69	1	
			20	18	55	25	3	113	27	20	15	12	9	
			3		3	1		1			4	3	1	
4	9	20	1,034	170	938	793	236	701	2,324	479	608	414	412	
1	1		311	39	138	94	33	184	412	132	93	65	39	
3	4	8	579	53	251	253	56	362	824	303	196	183	138	
			26	3	21	11	1	13	32	12	8	13	9	
			7	7	15	13	8	66	175	1	1	3	4	
				4	2	9		17	9	1	1			
			1	3	27	36		40	36	22		7	3	
2			77	6	132	138	14	291	396	9	1	30	17	
					1		1	1	4					
	1		12	61	241	35			9		2	13	622	2
			1	2	2	1		5	103			1		
								1						
			10		2	2	77	11	10					
16	2	10	280	17	180	275	891	228	82	34	6		2	
			1	1	4	3			3	2			7	
			1						1					
			8				1		6			1		
			1						1			2		
													1	
					4			2			2			
				3	4	1	2	11	4	5		1	2	
3			69	3	47	77	2	7	206	1	11	5	17	
			15	5	14	7	22	8	25	27	15	43	5	
			3	1			1			5	2		1	
1			68	13	30	33	17	16	29	31	110	85	15	
1			65	6	32	52		32	32	46	110	57	55	
									1					
1			5	4	5	10	9	27	30	7		2	1	
			3		4			5	5	5	7	7	1	
					1	1			3		2			
					1			1	2					
			4						9					
			5	5	4	2	1	6	8			1	4	
	1		14	10	7	7	258	13	22					
32	18	38	2,639	498	2,250	1,980	1,668	2,432	4,928	1,197	1,219	1,034	1,505	2

STATEMENT of Rejections, by Causes, at Ocean Ports, from December, 1902, to March 31, 1917.

	Fiscal Year.															
	1902-1903.	1903-1904.	1904-1905.	1905-1906.	*1906-1907.	1907-1908.	1908-1909.	1909-1910.	1910-1911.	1911-1912.	1912-1913.	1913-1914.	1914-1915.	1915-1916.	1916-1917.	Totals.
Accompanying patients	16	.....	13	39	21	58	60	42	104	53	28	76	58	4	8	580
Bad character	.....	... .	12	1	61	181	87	98	122	112	80	102	56	17	4	933
Contract labour	.....	.. ..	.....	.....	....	23	....	33	28	3	.....	... ...	... ..	.....	.	87
Criminality	.....	..	1	6	7	17	6	9	10	5	4	3	2	4	. ...	74
Head tax	.....	.....	.....	.. ..	.....	.....	....	.....	.....	6	.....	.....	...	....	.....	6
Lack of funds	.....	...	.....	1	.. ..	85	67	34	1,038	246	204	994	452	38	55	3,214
Likely to become public charges	.....	49	56	73	57	292	66	681	274	161	56	76	71	55	55	2,025
Medical causes	257	225	529	404	264	513	216	585	585	256	328	398	319	34	30	4,943
Not complying with regulations	.....	.. ..	.....	.. ..	30	3	7	33	48	119	55	178	40	11	22	546
Previously rejected	.....	.....	.. ...	.....	.....	.....	.....	.....	1	8	1	.....	...	.....	.....	10
Totals	273	274	611	524	440	1,172	509	1,515	2,210	972	756	1,827	998	163	174	12,418

' (Nine months.)

STATEMENT of Rejections, by Nationalities, at Ocean Ports, from December, 1902, to March 31, 1917.

	Fiscal Year.															
	1902-1903.	1903-1904.	1904 1905.	1905 1906.	*1906-1907.	1907-1908.	1908-1909.	1909-1910.	1910-1911.	1911-1912,	1912-1913.	1913-1914.	1914-1915.	1915-1916.	1916 1917	Totals.
British	2	8	13	76	61	130	146	183	233	227	161	171	169	42	28	1,650
American	.....	.....	27	17	17	63	2	13	20	2	14	12	29	28	15	259
Other Countries	271	266	571	431	362	979	361	1,319	1,957	743	581	1,644	800	93	131	10,509
Totals	273	274	611	524	440	1,172	509	1,515	2,210	972	756	1,827	998	163	174	12,418

* (Nine months.)

STATEMENT of Deportations, after having been admitted, by Causes, from December, 1902, to March 31, 1917.

—	Fiscal Year.															
	1902-1903.	1903-1904.	1904-1905.	1905-1906.	*1906-1907.	1907-1908.	1908-1909.	1909-1910.	1910-1911.	1911-1912.	1912-1913.	1913-1914.	1914-1915.	1915-1916.	1916-1917.	Totals.
Accompanying patients	4	3	1	4	35	26	21	. .	18	17	16	10	34	5	9	203
Bad character	....	1	.....	4	.. ..	30	71	44	71	120	165	159	128	68	60	921
Criminality	.....	1	8	1	12	68	115	130	172	242	334	376	404	329	277	3,469
Medical causes	49	61	58	110	126	392	467	212	222	229	370	570	379	206	98	8,549
Not complying with regulations	....	. .	....	...	.....	....	.....	...	12	8	4	4	.....	... ...	.....	28
Public charges	14	19	19	18	28	309	1,074	318	289	343	392	715	789	635	161	5,153
Totals	67	85	86	137	201	825	1,748	734	784	959	1,281	1,834	1,734	1,243	605	12,323

* (Nine months.)

STATEMENT of Deportations, after having been admitted, by Nationalities, from December, 1902, to March 31, 1917.

—	Fiscal Year.															Totals.
	1902-1903.	1903-1904.	1904-1905.	1905-1906.	*1906-1907.	1907-1908.	1908-1909.	1909-1910.	1910-1911.	1911-1912.	1912-1913.	1913-1914.	1914-1915.	1915-1916.	1916-1917.	
British	50	69	74	112	168	607	1,235	486	458	540	559	952	877	602	186	6,975
American	.....	.....	.....	2	8	37	98	119	169	256	377	405	461	437	324	2,693
Other Countries	17	16	12	23	25	181	415	129	157	163	345	477	396	204	95	2,655
Totals	67	85	86	137	201	825	1,748	734	784	959	1,281	1,834	1,734	1,243	605	12,323

*(Nine months.)

STATEMENT of Deportations, after having been admitted, by Provinces, from December, 1902, to March 31, 1917.

—	Fiscal Year.															
	1902-1903.	1903-1904.	1904-1905.	1905-1906.	*1906-1907	1907-1908.	1908-1909.	1909-1910.	1910-1911.	1911-1912.	1912-1913.	1913-1914.	1914-1915.	1915-1916.	1916-1917.	Totals.
Maritime Provinces	.....	2	.....	3	2	14	19	24	25	13	45	45	55	48	19	314
Quebec	18	16	11	27	41	136	684	97	165	186	208	371	397	236	108	2,701
Ontario	3	3	8	19	79	383	907	378	349	348	419	574	543	461	233	4,707
Manitoba	.....	.....	.....	.....	66	226	48	97	121	174	230	334	199	143	40	
Saskatchewan	46	64	67	88	3	19	27	19	23	35	44	59	85	96	54	3,329
Alberta	.....	.....	.....	.....	4	24	14	63	55	95	131	164	224	114	34	
British Columbia	.....	.....	.....	.....	5	23	49	56	46	108	264	287	228	145	116	1,267
Yukon Territory	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	3	.....	1	5
Totals	67	85	86	137	201	825	1,748	734	784	959	1,281	1,834	1,734	1,243	605	12,323

*9 months.

The following is a statement showing the immigration literature, etc., ordered during the year 1916-17:—

Immigration Facts and Figures	3,000
Atlas of Canada (French Edition)	26,800
Eastern Quebec pamphlets (French Edition)	25,000
Western Quebec pamphlets (French Edition)	25,000
Western Quebec pamphlets (English Edition)	10,000
Eastern Quebec pamphlets (English Edition)	....
5,000 Facts about Canada	300
Canada West	346,650
Canada West (French Edition)	25,800

During the year, 159,276 pieces of mail were received and attended to. The outgoing letters and telegrams for the year numbered 136,286.

W. D. SCOTT,
Superintendent of Immigration.

Report for the fiscal year ending March 31, 1917:—

During the fiscal year just closed, 393 persons of Chinese origin have been admitted into Canada, of whom 121 were admitted as exempt from head tax, and 272 upon the payment of $500 each. For the purpose of comparison it is considered advisable to publish statistics relating to Chinese immigration since the imposition of the first head tax in 1885, which head tax was increased to $100 on January 1, 1901, and to $500 on January 1, 1904.

Fiscal Years.	Exempts.	Paying Tax.	Percentage of total arrivals admitted exempt.	Registered for leave.	Total revenue.
					$ cts.
1886	1	211	0·47	829	11,693 00
1887	.....	124	.....	734	7,424 50
1888	.....	290	.....	868	15,694 50
1889	112	782	12·53	1,322	40,808 00
1890	97	1,069	8·32	1,671	56,258 00
1891	12	2,114	0·56	1,617	107,785 50
1892	6	3,276	0·18	2,168	166,502 50
1893	14	2,244	0·62	1,277	113,491 00
1894	22	2,087	1·04	666	105,021 50
1895	22	1,440	1·50	473	72,475 00
1896	24	1,762	1·34	697	88,800 50
1897	24	2,447	0·97	768	123,119 50
1898	17	2,175	0·78	802	109,754 00
1899	17	4,385	0·39	859	220,309 50
1900	26	4,231	0·61	1,102	215,102 00
1901	26	2,518	1·02	1,204	178,704 00
1902	62	3,525	1·73	1,922	364,972 00
1903	84	5,245	1·58	2,044	526,744 00
1904	128	4,719	2·64	1,920	474,420 00
1904-5	69	8	89·61	2,080	6,080 00
1905-6	146	22	86·90	2,421	13,521 00
1906-7	200	91	68·73	2,594	48,094 00
1907-8	752	1,482	33·66	3,535	746,535 00
1908-9	695	1,411	33 00	3,731	713,131 00
1909-10	688	1,614	29·89	4,002	813,003 00
1910-11	805	4,515	15·13	3,956	2,262,056 00
1911-12	498	6,083	7·56	4,322	3,049,722 00
1912-13	367	7,078	4·93	3,742	3,549,242 00
1913-14	238	5,274	4·32	3,450	2,644,593 00
1914-15	103	1,155	8·19	4,373	588,124 00
1915-16	69	20	77·53	4,064	19,389 00
1916-17	121	272	30·79	3,312	140,487 00
	5,445	73,669	7·39	68,525	17,593,056 00

The marked decrease in Chinese immigration during 1915-16 and 1916-17, as compared with former years is on account of the Order in Council prohibiting the arrival at British Columbia ports of artisans and labourers, skilled or unskilled. Those admitted during 1916-17, upon payment of head tax, were largely boys coming to Canada to attend our public schools, and the exempt admissions were Chinese merchants and their families.

Since the outbreak of war there has been a considerable diminution in the number of Chinese in Canada, as of the large number who have gone on visits to China comparatively few have as yet returned to the Dominion.

W. D. SCOTT,
Chief Controller of Chinese Immigration.

Report on the work of the Emigration Branch of the Department of the Interior in the British isles for the year ending March 31, 1917.

CONTINENTAL AGENCIES.

No reports are available from any point on the continent of Europe.

PROPAGANDA.

The great war still being materially in evidence, no active propaganda has been engaged in, though we have received an increased number of inquiries from time to time. No emigration or other lectures on Canada have been given, except where a special request has come from schoolmasters or others, the same being considered by the department inadvisable.

AGENTS IN CHARGE.

Owing to the death of Mr. A. F. Jury, for many years representing this department in Liverpool, and for military and other reasons, the permanently appointed agents at the following points are temporarily substituted by the following:—

Liverpool, Mr. S. Salingar.
Aberdeen, Mr. J. A. F. Murray.
Birmingham, Mr. W. Bond.
Carlisle, Mr. Geo. M. Holmes.
Peterborough, Miss E. Maude Whitsed.
Cardiff, Miss D. Thornley .

MILITARY DUTIES.

During the past year other juniors, having come of military age, have immediately joined His Majesty's forces. There has not been, since the war started, any official of military age who has not enlisted. And at least two of the lady members are regularly engaged in hospital duties.

EXHIBITIONS AND SHOWS.

Some annual agricultural exhibitions and shows have been cancelled through the exigencies of war, but we have done the best we could with the material at hand, when any opportunity arose.

SCHOOL ATLAS.

The distribution of the Atlas of Canada, amongst the school children, has been successfully continued.

CANADIAN NEWS ITEMS.

This propoganda has been continued more satisfactorily than had been hoped was possible under war conditions, and has materially helped emigration to Canada from being forgotten, as abolition of all active propaganda made certain.

EXPENDITURES.

The amount expended here for all purposes has been:—

Fiscal year ending March 31, 1914				£51,000
"	"	"	31, 1915	57,100
"	"	"	31, 1916	31,600
"	"	"	31, 1917	27,400

SAILINGS TO CANADA.

The number of steamers sailing from the British Isles to Canada cannot be given in any public document; but there has been no lack of accommodation for those who were not required for military service.

WARTIME RESTRICTIONS.

In addition to the Compulsory Military Service Act, the requirements of national service preclude the embarkation of women as well as men who might be required for any kind of national service here. And, owing to the danger from submarines, for some months an Admiralty embargo has been enforced against the embarkation of women and children of any age or class. It is impossible to say how long these restrictions will continue. No person can leave, in any event, without the written permission or passport of the British Government.

EMIGRATION RETURNS.

The British Board of Trade have not issued any figures during the past year.

Statistics for the Year 1917.

Number of letters (London Office) received and sent out	87,351	Large increase over 1916.
Callers at London Office	17,194	
Atlases of Canada given at Counter (London)	15,995	
Packages of literature mailed from London Office	20,886	
Grain and grasses in straw distributed from Liverpool	85 cases.	
Threshed grain for exhibitions, etc., distributed from Liverpool.	23 "	
Atlas of Canada distributed from all offices in British Isles	139,400	
Wall map distributed from all offices in British Isles	2,762	
Pieces of literature (exclusive of the Atlas of Canada) distributed from all offices	100,931	
Number of persons admitted under Assisted Emigration Regulations	43	
Number of boats inspected	127	
Deported cases attended to	176	
Lantern slides (sets loaned)	148	

War conditions and a much depleted staff account for this abbreviated report.

J. OBED SMITH,
Assistant Superintendent of Emigration.

REPORT OF W. J. WHITE, INSPECTOR OF UNITED STATES AGENCIES.

Those who are interested in figures and tables, and look to them for facts reduced into concrete information, will look to other pages of this report. They will find that the carrying out of the details of the immigration propaganda in the United States for the past fiscal year has furnished results satisfying to those who are looking for increased immigration.

Early in April, 1916, I was in one of our offices in the Western States when there entered a tall, heavily-built farmer, whom I recognized as a man I had talked with a few months previously. He was a renter on an Illinois farm, and each year, for some years, he had been handing over to his landlord twelve dollars an acre rent, and he was making a little money at that. He wanted a change, his forty-five summers had passed, and his four boys and three girls were grown up, or growing up. His mind had been bent on Western Canada, but every time he thought of it, in kaleidiscopic order there flashed before him in big letters "Conscription, heavy land taxes," and a score of other things insurmountable, as they had been pictured by those interested in keeping settlers from Canada. He could not be budged, and he was let alone; except that his name was carefully registered, and month after month his mail brought to him a pamphlet, or a circular, or a personal letter. The news was sent to him of the big crops of 1915, of the heavy yields of wheat, averaging twenty-five to forty bushels per acre, and as he read of seventy-bushel yields, one can imagine him pouring over these figures, analyzing the cost details, and when he saw a net profit of more per acre than he was paying out for rent, it can readily be understood that he became interested. He told me his story, told me how the interest was aroused until at last it became a decision. Eight tickets were secured, his family given their clearance, and I heard from him a short time ago, that he had bought a half section of land and two of his sons had homesteaded a quarter section each. He had a good crop of oats, and had written back for some of his friends to follow his example, and take up land in Canada.

This man's fears had been dispelled. This is but one instance, but it shows pretty well one phase of our work in the United States and how it is carried on.

That day in April was the day we began to feel that the air was becoming brighter again, when it was realized that the stories of the past year or so, that had been so diligently fabricated and systematically circulated throughout the country, had been overtaken and their work nullified. Our correspondence from that time on began to increase, the personal inquiries became greater, and the general interest showed that a revival was not only due but under way.

When the figures for 1916-17 were set at an increase of 75 per cent over the previous year, it was with a determination that our resources in energy would be set to accomplish it. That it has reached 66 per cent more is pleasing to those who assisted in bringing it about.

The agents in the territory noticed it, and their reports, week by week, showed the inspiration that gave them encouragement. They became more heartily industrious, and as time passed, and the daily and weekly comparisons of increases over the previous year were recorded, they knew that the tide had turned, that the results at the end of the year would show a greatly improved condition; and they did. All know, of the many misstatements that were being circulated. Well, they were combatted through the press, and by personal effort on the part of the agents, and, what was of greater effect, the denials sent by residents of Canada to their friends in the States. Gradually, the press has come to our side, and to-day, there are to be found very few in the more populous districts, who are not willing to give us a fair hearing. I do not attribute this altogether to the fair manner in which the press has been treated by the department but to the fairness of the newspaper men themselves.

and I wish to add here my acknowledgment of the valuable assistance the United States press has been. Of course they had facts before them that could not be ignored.

There was Western Canada's big crop of 1915, the large increases of all grains, the reports of yields of forty, fifty, sixty and as high as seventy bushels of wheat per acre, and a general average of over thirty bushels per acre. Then the prices were good. Farmers, former residents of Illinois, Iowa, Nebraska, Minnesota, and a score of other States, enthused by the great success that they were having by farming operations in Canada, wrote the stories to their friends. The Smith boys had a section of land in Canada all paid for and under cultivation, with a bank account of over two thousand dollars, this was the evidence that created an impression that induced the Smith boys' friends to go to Canada. This is a single illustration of what the 1915 crop did for Canada, and this with the fact that Americans had no trouble in getting into Canada, and no trouble after they got there, greatly increased immigration during the fiscal year.

The fact that the correspondence at all the offices of the Government was largely increased over the previous year showed that it pays to advertise. The mediums used were carefully selected; the advertising was changed from time to time, and readers, carefully compiled as to facts, were inserted.

It was noticed last year that there was a growing interest in the Pacific coast states and particularly in California. Our representatives in attendance at the exhibition at San Diego regularly reported as to the work there, and it is pleasing to be able to record that a large number left for Western Canada. In a large measure, the exhibition made at San Francisco, and afterwards at San Diego, was responsible for this. After going carefully into the situation in California, I was led to recommend the establishment of a regular agency in California. This is important, and the department, in arranging for it, may be assured that the work in California will increase. I expect to visit San Francisco soon and select a location for an office.

Exhibiting the products of Western Canada farms at state, county and local fairs, as well as national exhibitions, was work that occupied the time and attention of our agents during the late summer and fall. This is a class of advertising that is useful, as it brings direct to those interested, excellent evidence of what can be done. The province of Quebec supplied some very good exhibits of the farms of that province at a great many fairs in the eastern states.

Reports made by the different agents show that there is a greater demand than in past years for land to purchase, whether improved or unimproved, consequently the exchange of property of this character has been away above the average. As a result of this demand prices of farm lands in Western Canada have shown considerable increase. There has also been an improved demand for homesteads. A few years ago, and not so long since, either, it was possible for those seeking homesteads, to secure them with very little trouble and small expense, as they were but a part of a day's journey from a railway station. That condition does not exist today. Then the homestead was a wide open stretch of prairie; to-day it is difficult to obtain anything like that, unless the homestead seeker chooses to go farther north and west into the Peace River district. The distance to these lands does not deter many, and the reports that are sent back to friends are exceedingly good.

The splendid homesteading area north of the Canadian Northern Railway, from Prince Albert west to Edmonton, is receiving a good deal of attention, and from what I can learn, a large number are going in there. These lands, I am led to believe are capable of a high production in grains, and especially adapted to mixed farming, the results from which, in a few years' time, will justify all that may be said of them from an agricultural standpoint.

I look for a considerable increase in 1916-17 over the past fiscal year. The prospects are bright.

W. J. WHITE,
Inspector of U.S. Agencies.

REPORT OF THE ACTING COMMISSIONER OF IMMIGRATION.

WINNIPEG, MANITOBA, May 25, 1917.

IMMIGRANTS FROM THE BRITISH ISLES.

On account of war conditions, and, latterly, of more stringent regulations governing the emigration of people from the British Isles, a very small number of British-born people came to Western Canada during the year.

IMMIGRANTS FROM THE UNITED STATES.

The number of settlers from the United States who entered Canada at western ports of entry during the year shows an increase of about 100 per cent, compared with the previous year, as shown by the following statement:—

SETTLERS FROM THE UNITED STATES, 1916-17.

Port of Entry.	Number of Settlers.	Settlers' Wealth.	Carloads of Settlers' Effects.	Value.
		$		$
Port Arthur, Ont	142	10,960	....	.....
Fort William, "	87	8,481	.....	.....
Fort Frances, "	2,638	194,479	38	64,750
Sprague, Man	219	38,367	8	7,700
Emerson, "	7,024	992,772	248	372,000
Gretna, "	891	456,799	45	51,875
Bannerman, Man	174	42,483	7	6,032
Snowflake, "	112	4,000	26	39,229
North Portal, Sask	4,342	1,597,281	501	659,597
Marienthal, "	47	10,019	.....	.....
Big Muddy, "	31	5,775	.....	7,393
Northgate, "	93	62,934	15	26,800
Coutts, Alta	2,000	564,963	133	242,401
Newgate, B.C	222	15,429	.....	.....
Waneta, "	125	9,775	.....	.....
Kingsgate, "	4,356	675,556	152	331,407
Grand Forks, B.C	133	.....	.....	.....
	22,636	4,690,073	1,173	1,809,184
As compared with year 1915-16	11,655	2,869,759	641	919,208
Increase	10,981	1,820,314	532	889,976

LABOR CONDITIONS.

The demand for farm hands, domestic servants, and house-keepers was good during the year, 9,536 persons having been sent to employment on farms from this office.

WAGES.

The wages paid for all classes of farm help ruled high during the year, as will appear from the following figures:—

	Season (7½ months).	Winter (4½ months).
Farm hands, experienced	$40 00 to $50 00	$20 00 to $25 00
" inexperienced	15 00 25 00	10 00
Married couples, experienced	55 00 60 00	35 00 40 00
" inexperienced	35 00 45 00	25 00 35 00
Domestic servants	18 00 25 00, the year round.	

In all cases with board and lodging.

BOUNDARY PORTS.

The duties of inspectors at boundary ports have steadily increased during the year. The ports under my jurisdiction have been regularly inspected by Mr. L. L. Kramer, travelling boundary inspector.

ROYAL NORTHWEST MOUNTED POLICE.

During the year the officers and members of the Royal Northwest Mounted Police have rendered invaluable assistance to this department and to settlers.

IMMIGRATION HALLS.

The immigration halls in the west have afforded ample accommodation to a large number of settlers. These halls have been regularly inspected by Mr. Herbert G. Johnston during the year.

IMMIGRATION HALL, WINNIPEG.

This hall afforded accommodation to 1,354 persons during the year, a combined total of 4,062 days. The destitute cared for numbered 61, who were supplied with 658 meals, at an average cost of 9·6 cents per meal.

The deports cared for numbered 143—meals supplied, 2,011, at an average cost of 9·6 cents.

IMMIGRATION HOSPITAL, WINNIPEG.

The patients who received treatment numbered 43, with an average stay of 15½ days. The meals supplied to patients and staff numbered 4,676, at an average cost of 11·9 cents.

The out-door patients numbered 26.

OFFICIAL STAFF.

The officers engaged in immigration work under the direction of this office have performed their duties efficiently.

CROP, 1916.

The Government inspections (all railways) to March 31, 1917, give the following figures:—

		Bushels.
Wheat		133,569,928
Besides the quantity of wheat in store in country elevators on that date was		40,437,800
In transit		4,000,000
In farmers' hands for sale		20,000,000
For home consumption, seed, etc		35,000,000
		233,007,728
Less—dual inspections	3,000,000	
1915 crop	5,000,000	
		8,000,000
Total yield 1916 crop		225,007,728

The following tabulated statements give the acreage, total yield and average yield per acre in 1916:—

Manitoba.

——	Acreage.	Yield In bushels.	Average yield per acre.
Spring Wheat	2,298,000	27,576,000	12·00
Winter Wheat	7,900	138,000	17·50
Oats	1,271,000	41,625,000	32·75
Barley	614,000	13,815,000	22·50
Flax	22,000	237,000	10·75
Rye	28,000	560,000	20·00
Peas	3,112	45,231	14·5

Saskatchewan.

Wheat	7,457,700	123,448,000	16·50
Oats	3,180,600	135,971,000	42·75
Barley	344,000	10,062,000	29·25
Flax	497,700	5,724,000	11·50

Alberta.

Spring Wheat	2,067,000	47,541,000	23·00
Winter Wheat	42,000	1,197,000	28·50
Oats	1,746,500	77,283,000	44·25
Barley	281,400	8,090,000	28·75
Flax	81,000	1,114,000	13·75
Rye	19,000	523,000	27·50
Grand totals	19,960,912	494,949,231	

PERCY REID,
Acting Commissioner.

REPORT OF CHIEF MEDICAL OFFICER OF THE DEPARTMENT OF THE INTERIOR, FOR THE YEAR 1916-17.

It is with regret that I have to again state that the continuance of the great war has so notably affected the normal trend of immigration to Canada that the total number of immigrants has been reduced to the small number of 75,374, of whom only 13,985 entered by the seaports, from foreign countries.

TABLE I.—Total Number of Immigrants entering Canada during fiscal year 1916-17.

Total immigrants, 1916-17, via seaports	13,985	Halifax	497
		Vancouver	456
Quebec	6,408	New York	3,017
St. John	1,636	Boston	176
North Sydney	1,032	Portland	36
Victoria	727	United States	61,389
		Total	75,374

As a consequence of this diminished immigration the work of medical inspection at the seaports has been reduced in a similar degree; while their absence at the front, or in service at home in some medical capacity in the army has still further dislocated the services of our medical officers. It has been, however, fortunate that the several immigration hospitals of the service have become available for military purposes in connection with the care of returned soldiers.

SESSIONAL PAPER No. 25

TABLE II.—Giving Rejections by Nationalities at Ocean Ports, for Fiscal Year 1916-17.

Australian	4	Newfoundlanders	4
Austrian	1	Russian	1
Chinese	2	Norwegian	2
Dutch	4	Swedish	3
French	2	Spanish	5
English	24	Swiss	1
Irish	3	Syrian	3
Scotch	1	United States citizens	15
Greek	38	West Indian	10
Italian	38		
Japanese	9	Total	174
Maltese	4		

Table II shows the total rejections of immigrants at the seaports to have been 174, of which, rather curiously, nearly a half were Greeks and Italians. The English were the only other nationality of which a considerable number were rejected. Of the total 174 there were 131 rejections from countries other than Britain and the United States.

TABLE III.—Giving Rejections by Causes at Ocean Ports for Fiscal Year 1916-17.

Brights disease	1	Trachoma	8
Conjunctivitis	1	Accompanying patients	8
Heart disease	2	Desertion	2
Hernia	7	Immorality	2
Mental deficiency	4	Indirect passage	22
Poor physique	2	Lack of funds	55
Senility	2	Likely to become public charges	55
Syphilis	1		
Tinea tonsurans	2		152
	22	Total	174

In Table III are given the rejections, by causes, from which it is apparent that a few only were on account of disease. Eight were rejected due to trachoma; 4 due to mental deficiency; 7 on account of hernia; 2 due to heart disease, and 2 on account of tinea tonsurans. The greater number, however, were rejected for non-medical causes and were due to infraction of the Act relating to lack of funds, likely to become a public charge, or indirect passage.

Much more important, however, than rejections at the seaports are the deportations which have taken place of immigrants during the year, as will be seen from the following table, total number reaching 605.

TABLE IV.—Giving Deportations by Provinces for Fiscal Year 1916-17 at Ocean Ports.

Maritime Provinces	19	Alberta	34
Quebec	108	British Columbia	116
Ontario	233	Yukon Territory	1
Manitoba	40		
Saskatchewan	54	Total	605

This total number, as might be expected, shows a great decrease from that of the previous year, owing to the yearly lessening number of immigrants during the three years since the war began. It is interesting to note that the majority of these have been from two provinces—Ontario and British Columbia.

TABLE V.—Deportations by Nationalities for Fiscal Year 1916-17.

Australian	1	Polish, Russ	2
Belgian	4	Russian, N.E.S.	13
Chinese	2	Finnish	3
Dutch	2	Norwegian	4
French	7	Swedish	1
English	129	Spanish	1
Irish	16	Turkish, N.E.S.	1
Scotch	40	United States citizens	324
Welsh	1	West Indian	8
Greek	8		
Hebrew, Russ	2	Total	605
Hindoo	2		
Italian	28	British	186
Japanese	1	American	324
Mexican	8	Other countries	95
Newfoundlander	1		
New Zealander	1	Total	605

TABLE VI.—Causes for which deportations have taken place for Fiscal Year 1916-17.

Blindness	1	Paralysis	4
Brights disease	1	Pleurisy	1
Cystitis	1	Syphilis	3
Drug habit	15	Tuberculosis	13
Empyema	1	Ulcer	1
Epilepsy	5	Accompanying	9
Feeble-mindedness	12	Criminality	277
Heart disease	1	Immorality	11
Hernia	1	Public charge	161
Hip disease	1	Prostitute	3
Insanity	49	Vagrancy	31
Lead poisoning	1		
Locomotor Ataxia	1	Total	605
Ostitis	1		

Of the medical causes for which deportation took place insanity is by far the most important. The number, in spite of decreased immigration, remains high, and is 49, as compared with 62 for the previous year.

The seriousness of insanity as a disease in immigrants is not only illustrated by this large number, but also the extreme importance of more exact data being obtained regarding the previous history of immigrants before their embarkation is made yet more obvious. It is not only that the insane person becomes a menace to the community, but also that in after years he is the occasion of much expense to the State should his breakdown occur after the regular period for deportation has expired. Further, the hereditary nature of the disease indicates how many families may thus become residents of the country, who, from the standpoint of efficiency, will in the future prove most undesirable.

Oddly enough, as associated with insanity, we find that persons afflicted with the drug habit caused the largest number of deportations for medical reasons. This form of disease must be set down as due to a neurosis, akin to alcoholism, often hereditary. It is the defectives, both mental and physical, who are the most common subjects of this habit.

The next cause, allied and associated with insanity, is feeble-mindedness, of which twelve cases were deported. The distinction is increasingly being drawn between the two neuroses, i.e., feeble-mindedness or *amentia* and insanity or *dementia*. The first includes defectives who never, through heredity or other reasons, have developed a normal mentality, while the latter includes those who may have been normal, but who, through disease or other cause, have become insane and thus mentally abnormal. It is interesting, further, to note that epilepsy, another form of nerve disease, was the cause of five deportations, while paralysis caused four and locomotor ataxia one.

The disease next in importance, as regards numbers, is tuberculosis, of which thirteen were deported. This number is much reduced from last year, when forty-seven were deported; but as will be seen in a later table the number probably has been decreased, due, at any rate, in part, to the difficulties of deportation; since it will be found that fifty cases of tuberculosis, in immigrants who had entered Canada within two years, came within observation of the medical officer at Vancouver. It is also of interest to note that few immigrants who had been in the immigration hospital at Winnipeg, the great centre for western immigration, are found amongst the deports. The total number during the year was forty-three, while twenty-six non-resident patients received treatment there. The deportations from our Winnipeg hospital were sixteen.

As president of the National Conference of Charities and Corrections during the past year, my duties have brought me into especially close contact with the many social agencies whose work brings them into direct relation with immigrants and the children of immigrants, especially in the cities of the different provinces of Canada. Through these agencies I have been able to obtain many facts, which make the truth illustrated by the tables yet more plain. It is the immigrants's life as a citizen that has for all the greatest importance, both as regards his influence upon the community in which he lives and the reaction of that community upon him. It is difficult to obtain exact statistics with regard to any one or several classes of immigrants in the different provinces for comparative purposes; yet I have been able to obtain certain data which are worthy of consideration. The following table, for instance, supplied through the kindness of R. C. Dexter, secretary of the Charities Organization, Montreal, illustrates an interesting situation.

TABLE VII.

City of Montreal: Nationality of total population by number and per cent compared with nationality of 1,000 consecutive charity organization cases.

Nationality.	City of Montreal.		Charity Organization Society Cases.	
	No.	Per cent.	No.	Per cent.
Canadian born—				
English speaking.	87,645	18·66	130	13·00
French "	295,972	63·02	357	35·70
Non-Canadian born—				
American.	9,489	2·02	43	4·30
British	42,834	9·12	370	37·00
Others	33,728	7·18	100	10·00
Total	469,658		1,000	
Summary of above : Immigrants and native born.				
Canadian born	383,617	81·68	487	48·7
Immigrant	86,051	18·32	513	51·3

NATIONALITY OF FOREIGN CASES.

Austrian and German	20
Belgian	2
Chinese	1
Dutch	2
French	11
Greek	4
Italian	27
Russian	15
Roumanian	3
Scandinavian	10
Spanish	2
Syrian	3
Total	100

The most outstanding fact presented by this table of persons dealt with by the Charities Organization Society of Montreal, is that 51·3 per cent of such were immigrants and but 48·7 per cent were Canadian-born, while less than one-fifth of the population of Montreal were foreign-born. The next most important point is that of the total charity immigrant cases 72 per cent were British-born.

The following table for the year ending March 1, 1917, was supplied through the kindness of Superintendent Dr. C. K. Clarke, of Toronto General Hospital.

TABLE VIII.—Giving persons attending feeble-minded clinic of Toronto General Hospital for year, March, 1916, to March, 1917.

Total number attending clinic	922
" " under 16 years	512
" males	531
" females	391
Source whence sent—	
Juvenile Court	405
City Health Department	147
Medical Inspector of Schools	125
Social Agencies (Institutions, Children's Aid Society Neighbourhood workers)	167
Military authorities	32
Private	46
	922

Nationality—			
Canadian	446	Jamaican	3
English	264	Dutch	2
Russian	50	German	2
Scotch	38	French	2
Irish	29	Italian	1
Polish	28	Syrian	1
American	22	West Indian	1
Roumanian	12	Not known	17
Welsh	4		

While in less than two years the number attending this clinic have increased from 405 to 922, it is important to note that the decrease in immigration has in no degree lessened the proportionate number of foreign-born attending. The Canadians increased 2·2 times, the English increased 2·64 times, the Scotch 2·1 times, American 3·1 times, Irish 4·1 times, Russians 5 times, and Polish 14 times. It might perhaps be expected that the large number of English would be maintained, but it is quite remarkable that Russians should have increased 5 times and Poles 14 times. It is probable, as a partial explanation, that these people are becoming more socialized and so are brought more under the attention of public school and other authorities.

That Russians and Poles, during these years in which there has been almost no immigration, should have together increased from 12 to 78 is a fact so startling as to demand close scrutiny.

I have been enabled, through the kindness of Dr. H. Underhill, medical officer of the city of Vancouver, to obtain a table seeming to illustrate the fact that in spite of any precautions which have been taken to inspect immigrants at the border, a very notable number, indeed, have succeeded in reaching Canada, who must have been at the time of admission infected with tuberculosis, though the disease may not have been diagnosable under the condition of inspection as carried out.

TABLE IX. Giving Immigrants treated in Vancouver Hospitals in 1916, on account of Tuberculosis.

Russian	13	Austrian	2
Italian	7	Belgian	1
Swede	4	Hindoo	1
Chinese	4	French	1
English	4	Manx	1
American	3	Greek	1
Norwegian	3	Japanese	1
Scotch	3	German	1

Of the fifty cases of immigrants given in the table, twenty-seven, or more than 50 per cent died, and in every case residence in Canada had been either two years or less; while in the whole table no single case seems to have been in Canada longer than this length of time. The nationality of these immigrants is interesting.

I have not been able to obtain information regarding the important point of whether or not many of these immigrants came into Canada from the United States, although Dr. Underhill says most of such, in other years, seem to have entered Canada directly at the seaports; but the proportion of certain nationalities would suggest such to have been the case. *Of the total of fifty, thirteen or more than 25 per cent were Russians, a number wholly out of proportion to those who have entered directly from Russia through any of our seaports. The same is true regarding the seven Italians, who form 14 per cent of the total, and perhaps will apply in the case of Swedes, Austrians, Americans and Norwegians. It is notable that though there is a large number of Chinese in Vancouver, but four appear in the list, and only one Japanese.

These several tables, compiled from city statistics in four separate urban centres, in different provinces, serve to illustrate what has already been referred to regarding the intimate relation which the immigrant bears, and must continue to bear, as a social force for good or ill, in relation to our national life.

Apart from any physical or economic disabilities growing out of the transfer of persons who formerly were agriculturists suddenly into urban surroundings, certain social and moral effects seem to follow in many instances. The mental alertness growing out of an upbringing in an urban environment is not present in such; while they have not yet been educated to resist the malign influences which may surround them in their new life. It, hence, too frequently happens that they degenerate and create, as seen in the statistics, very serious social problems in our urban communities. It would seem therefore that special facilities should be provided by the department to encourage their settlement on homesteads, even in cases where they may be lacking in capital.

In a recent interview held with the Provincial Secretary of Ontario by the Association for the Feeble-minded, the extent to which this class amongst immigrants was creating a necessity for the establishment of new provincial and municipal institutions for the care and education was fully illustrated by many facts pointing

* The large number of Russians found at the feeble-minded Clinic in Toronto will be recalled.

to the need of yet greater precautions being taken by this department in the selection of immigrant families prior to coming to Canada. It is to be expected, when matters begin to assume their normal condition after the war, and the stream of immigrants begins again its flow toward Canada, that action will have been taken to provide measures to this end, in keeping with the experience gained both in the United States and Canada.

PETER H. BRYCE,
Chief Medical Officer.

JUVENILE IMMIGRATION.

Report of Chief Inspector of British Immigrant Children and Receiving Homes in Canada, for the fiscal year ended March 31, 1917.

It will be observed that the work of this branch of the department has been carried on with little or no interruption during the past twelve months.

Owing to the dangers and unsettled conditions of maritime affairs, a very small number of children were permitted to leave Great Britain during 1916. "After the war," however, it is anticipated by friends and supporters of the movement, that there will be a notable increase in the number of children coming to Canada from Great Britain. This may of course be dependent, to some extent, on the industrial conditions of the Motherland.

For the past two years the services of many boys and girls, who otherwise would probably have to come to this country, have been utilized in munition works, on farms and in other branches of national service, thus filling the vacancies of men serving at the front.

The need in Canada for lads, as farm apprentices, and girls, for domestic service, has never been more urgent than at the present time, and ten thousand British juveniles would be cordially welcomed into advantageous foster homes and situations at the present time. The department has received many letters from Canadian farmers appealing for the services of Old Country boys.

It has been estimated by competent authorities that at least 50,000 farmers and farm labourers have answered the call of their country and are now on active military service overseas, a considerable number of whom were in their early days in Canada, British Juvenile Immigrants.

The Dominion is under a great debt of gratitude to those who have for many years promoted this particular form of immigration to our shores, a work which has been carried on in a sense independent of the Canadian Government. Over seventy thousand boys and girls, the former predominating numerically, have been settled in Ontario, Quebec, the Maritime, and other provinces through the efforts of these agencies. Many of these, now grown to manhood and womanhood, are known to me personally as highly respected and useful citizens of our Dominion, among them are some, who with their sons, are now fighting in France and Flanders with Canadian Battalions.

From 1900 to 1916, inclusive, the number of applications received for children by the various Homes, number 359,589, and to meet this demand 34,600 children were available. The applications, as I have indicated, in nearly every case were from farmers.

There is no longer any doubt that the Old Country boys or girls have more than average opportunities in Canada, and that splendid openings await them here, provided they are industrious and well behaved. One has only to consider the extent of the country and the vast areas of land not yet broken by the plough, to believe that there are opportunities without limit. One can easily realize that only the fringe of this work, on behalf of the British child has as yet been touched.

There are plenty of good and desirable boys and girls, too, in the homes and schools of both state and private control. The agencies are willing to undertake the migration of larger numbers of children to this overseas Dominion, but the chief and insurmountable obstacle has been that of a limited supply of money available for the purpose.

The history of the British Juvenile Movement is most interesting and supplies a record of facts which proves the immense benefit of this undertaking to Great Britain, and the overseas Dominions from an Imperial point of view.

Speaking sometime since on behalf of Father Berry's Home at Liverpool—one of the pioneer institutions of that great city—in the cause of the poor boy and his transference to new fields of usefulness, the Marquis of Ripon said in part:—

> "Proud as we might be of our great competence in peace and war, and proud as we are of that magnificent commerce of which Liverpool is the centre, we might be more proud, or at all events equally proud, of the work which is being done in these days to raise the poor and to teach the ignorant, and to make, as far as possible, a fair opening to a prosperous position in life for the poorest and weakest of our people."

These are noble words, and their highest key-note is struck in the statement that child emigration has benefited "both mother country and the colonies."

The following Table shows the number of Chlidren emigrated by the principal Socities and Agencies during the past seventeen years:—

Agency.	Fiscal Year.																	Total.
	1900-1.	1901-2.	1902-3.	1903-4.	1904-5.	1905-6.	1906-7.	1907-8.	1908-9.	1909-10	1910-11	1911-12	1912-13	1913-14	1914-15	1915-16	1916-17	
Dr. Barnardo	385	889	1,150	1,188	1,574	1,434	941	950	1,034	1,010	924	971	933	564	760	293		15,003
Rev. R. Wallace	59	71	75	94	116	112		80	38	46	75	68	49	35	62			980
Miss Macpherson	60	45		142	201	207	91	166	175	175	227	220	229	149	215	101		2,402
Church of England Society	60	85	89	83	84	144	17	126	123	74	103	125	129	218	136	4		1,600
Bristol Emigration Society	33	38	13	40	40	72												236
J. W. C. Fegan	43		46	49	53	100		73	75	109	96	99	106	112	117	112		1,190
Liverpool Catholic	43																	43
Canadian Catholic Society	60	132	125	106														423
Catholic Emigration Association			151	206	328	359	175	332	308	317	334	399	318	253	255	162	108	4,005
Mrs. Birt	95	137	158	106	169	191	70	173	142	187	161	184	147	65	166	3		2,154
J. T. Middlemore	108	99	127	130		298		145	152	129	157	171	155	97	110	83	80	2,041
National Childrens Home & Orphanage	29	38	41	60	84	102	109	76	90	107	106	103	86	73	65		3	1,172
Girls Home of Welcome	2	4																6
Mr. Quarrier					157	187		183	173	139	192	181	184	186	162		55	1,819
Salvation Army						20	39		42	44	13	24	98	118	121	53	5	577
Children's Aid of London		2			3				24	23	26	27	28	19	30	10		192
Women's National								31										31
Mrs. Wallis								12	13	10		11						46
Mrs. Close								3							5			3
East End Emigration Fund			4									21	153		68			408
Self Help Society									13	22	80	47						
Mrs. Smyley						32	10	25	22	30	27	38	27	10	31			252
Working Boys Home				8		6												14
Private parties											3							3
	977	1,540	1,979	2,212	2,808	3,264	1,455	2,375	2,421	2,122	2,524	2,689	2,642	1,899	2,318	821	251	34,600

The following is a striking feature in the record of the individual inspection of these "young farm-helps" during the past year.

Number of children found in:—

Homes and situations—	
Good	1,439
Fair	27
Unsatisfactory	3
Health—	
Good	1,447
Fair	19
Unsatisfactory	3
Progress—	
Good	1,258
Fair	101
Unsatisfactory	10
Conduct and character—	
Good	1,421
Fair	45
Unsatisfactory	3
Poor Law boys formerly under the supervision of this department, who have enlisted for overseas service	522
Received honours	4
Killed in action	16
Wounded or missing	22
Did not actually arrive in Canada during 1915-16, although their emigration was approved of for that year	8
Temporarily lost track of	20
Absent on occasion of call of inspector at their homes	25
Returned to England	5
Removed to United States	3
Marriages	11
Deaths	4
Absconded	8

It gives me great pleasure to be able to express my confidence in and admiration for those philanthropists and others who have for so many years devoted their time and contributed their means in such a noble and humane cause, which truly may be designated as the master spirit of benevolent achievement.

The opinions which I have formed with regard to each child have been the result of personal interviews with the child and his employer. Amongst other matters to which I have given particular attention have been the following:—

1. Character of home in which the child has been placed, and the work expected of the child.
2. The treatment of the child by his employer.
3. The character of the child.
4. His religious and educational advantages.
5. The degree of satisfaction given by the child to his employer, and the contentment of the child with his new home.
6. The general state of the child's health and personal appearance.
7. The agreement entered into with the Home, and the compliance with same by the child's employer.

The following table, a remarkable statistical record, shows the value placed on these British children by the farmers of this country, and their acceptability as farm apprentices.

The number of juvenile immigrants received during the past seventeen years, together with number of applications received by the various agencies during the same period.

Fiscal Year.	Children emigrated.	Applications received.	Fiscal Year.	Children emigrated.	Applications received.
1900-1	977	5,783	1910-11	2,524	21,768
1901-2	1,540	8,587	1911-12	2,689	31,040
1902-3	1,979	14,219	1912-13	2,642	33,493
1903-4	2,212	16,573	1913-14	1,899	32,417
1904-5	2,808	17,833	1914-15	2,318	30,854
1905-6	3,264	19,374	1915-16	821	31,725
1906-7	1,455	15,800	1916-17	251	28,990
1907-8	2,375	17,239			
1908-9	2,424	15,417	Total	34,600	359,589
1909-10	2,422	18,477			

The organizations and benevolent institutions in Great Britain, which train children for lives of future usefulness, have done a great work for Canada.

The promptitude with which 8,049 youths and young men, many of whom in their early childhood and others as older lads came to Canada through British emigrating agencies, answered the call to the colours with their Canadian-born companions cannot be too highly commended. Their conduct has already created an entirely and wholly unexpected emphasis on the importance of the migration of juveniles to the dominions overseas.

In addition to those serving in the Canadian army, not a few have joined the navy and are at present doing duty on the high seas.

On my roll of honour there appear the names of hundreds of young fellows, who, during their minority, were subjects of the after care of this department, the larger proportion being personally known to me. These young soldiers are doing their part on the fields of battle nobly. One is reported to have gained the coveted Victoria Cross; a number have distinguished themselves and many have made the supreme sacrifice.

"The map of the world," said Mr. William Baker, Honorary Director of Dr. Barnardo's Homes, "is not the only thing which will be considerably altered by the war.

Many opinions firmly held in the days of peace have had to yield to the pressure of events and have undergone complete revision. Our migration work has sometimes been questioned by well-meaning friends, who feared that the young people whom we sent out to Canada were lost to the Mother Country. Our reply has always been that vital reasons governed our action in each case; that Canada opened up opportunities which the old country was powerless to offer, and that 95 per cent of our young migrants achieved success and became "worthy sons and daughters of the Empire."

Thos. E. Sedgwick, in his able and interesting article, "Lads for the Empire," also fittingly says: "Imperial migration is the more equal distribution of the population of the Empire. It is essential for the present and future well-being of the community that its volume should be materially increased."

SESSIONAL PAPER No. 25

FAIRKNOWE BOY GETS D.S.O. AND IS THEN KILLED IN ACTION.

"Information has reached town that Private George Marrs, D.S.O., who enlisted with the 73rd Highlanders at Northcote, has been killed in action, only three days after being awarded the D.S.O. on the field of battle.

"Private Marrs, who was a Fairknowe Home boy, was well known to many in town, and his death will be deeply regretted."—*The Times,* Brockville, March 27, 1917.

NOTE.—Fairknowe Home is the Canadian branch of Mr. Quarrier's orphanage at Bridge of Weir, Scotland.

Lieut. Reginald C. has been decorated with the Military Cross by King George for organizing and leading a trench raid, demolishing a mine shaft, and inflicting heavy casualties on the enemy. Lieut. C. was formerly a ward of Miss Macpherson, and came to Canada in 1909.

E. R., a Birmingham boy who came to Canada in 1910, enlisted in the early days of the war, has been awarded the Distinguished Conduct Medal.

Clipping from London "Free Press," January 3, 1917, re *Henry A. Stoneham—Memorial Service for late Sergt. Stoneham.*

Florence, January 2.—A memorial service was held in St. Matthew's church on Sunday evening in honour of the late Sergt. Harry Stoneham, who was killed in action on November 2. The service was conducted by the rector, Rev. Henry Smith, assisted by Rev. Henry Jones, of the Methodist church. The choir was assisted by three young men from Shetland, chums of the late Sergt. Stoneham. Sergt. Stoneham came to Florence when a young boy and spent most of his life in the town. He was in England on a visit when war broke out, and enlisted at once. He trained for four months, then was drafted to France in December, 1914, and had been on active service till his death.

For eight years this estimable young man was under the supervision of this department, and each year of his minority such splendid testimonials were given of him by his employer as the following: "He is greatly esteemed, is most useful and diligent in the discharge of his duty."

A gentleman from West Norwood lately reported to us a curious coincidence. In 1888, we emigrated to Canada a lad named Robert Grey. He did exceedingly well, and became a man of substance and respectability. At the opening of the war he enlisted, and is now at the front. Our Norwood friend has been in constant touch with him all through his Canadian career. Grey, in a recent letter to him, stated that not long before, as he walked through the trenches, he found in a shell-hole a Good Conduct Medal which bore the name of George Reeves and the title of our Homes (Barnado.) One Barnado boy by accident had picked up a medal which had belonged to another: Reeves, we knew of, as doing well in a situation in England, but this was our first intimation that he was in the army in France. Both, we found, were in the Grenadier Guards, one in the 77th and the other in the 87th Battalion.

TWENTY BARNARDOITES IN ONE REGIMENT.

From one of our Ever-Open-door Superintendents we have this: "I have had a letter today from Frederick James Stagg, an old Barnardo boy. He went out to Canada in 1911, after five years' stay in the Homes. He did well on a farm at Staffa, Ontario, was quite happy, and with good people; but he 'heard the call' and enlisted eleven months ago with the Canadian Infantry. At Stepney he was a musical boy (a 'bell-boy'), and he is now a bandsman in the 110th battalion. He says that at

the camp in Canada there were at least twenty Barnardo boys in the same regiment, some of whom had been at Stepney with him. Of twenty-five in the band, two others besides himself are old boys, and twenty-three are teetotallers, including these three. He is full of thanks and praise to the Homes. 'There is no place like Canada,' he adds. He gave us a donation of 10s, quite voluntarily, and to show his gratitude."

Number of boys who have enlisted from the different child agencies in Canada for overseas service.

Barnardo	March,	1917.	4,700
Middlemore	"	1, 1917.	434
Macpherson	"	21, 1917.	316
Church of England	"	20, 1917.	360
Catholic Emigration Association	"	20, 1917.	531
Salvation Army	"	1, 1917.	61
Mrs. Smyley	"	22, 1917.	110
National Children's Home and Orphanage	"	24, 1917.	511
Fegan	"	21, 1917.	352
Manchester and Salford Boys' and Girls' Refuges	"	19, 1917.	64
Mrs. Birt	"	19, 1917.	309
Quarrier	April	2, 1917.	301
Total			8,049

The total emigration of children, as pointed out, has been approximately 70,000; of this number at least 45,000 or two-thirds were boys, a fair allowance for deaths and other changes during forty or fifty years would be about one-third, bringing the number down to 30,000. As shown in the statement attached the total enlistment of boys of this class aggregate more than 8,000, and thus equals nearly 25 per cent of all the boys who came to Canada.

G. BOGUE SMART,
Chief Inspector of British Immigrant Children and Receiving Homes.

PART III

SURVEYS

SURVEYS.

REPORT OF THE SURVEYOR GENERAL OF DOMINION LANDS.

Owing to the falling-off of immigration the Dominion Lands Surveys appropriation for 1916-17 was reduced to $976,300. In accordance with the department's general policy of retrenchment during the war, a further saving of $202,050 was made, the amount expended being only $774,250, or $269,250 less than the previous year. As a consequence, the number of parties in the field was reduced to fifty, the smallest number for several years.

BLOCK OUTLINE SURVEYS.

In recent times settlers have been following down the great waterways of the North and forming settlements in remote districts. This necessitated the extension of meridian and base line surveys to include those settlements in the Dominion Lands system. The extension of these lines is now so far advanced that the number of base line survey parties could be reduced to three. The total mileage surveyed was 568, a somewhat larger average than for the preceding year.

One of these parties surveyed short portions of base lines east and west of the Sixth meridian from township 92 to township 112. This will allow of the subdivision into townships of all the land in this latitude and west of Peace river which is suitable for settlement. The surveyor reports a stretch of good, fairly open country between Peace river and the Sixth meridian and north of township 100; he also reports an area near Hay lake, which lies in the vicinity of township 112 and about thirty-six miles west of the Sixth meridian, where thousands of tons of first-class wild hay could be cut in a season. The surface of the land in this district is, as a rule, lightly wooded with poplar and willow, but a few stretches of heavy spruce and poplar were found, the trees measuring up to twenty-four inches in diameter.

A second party surveyed base lines in the lower Peace river valley, just west of lake Athabaska. This area is very level and during high water parts of it are flooded. The soil is alluvial and patches of swamp and muskeg are frequent. The district is excellent for stock raising as hay grows in abundance in all the open places and vast stretches of hay meadows are found, more especially south of the 29th base line (the north boundary of township 112). On the ridges some good timber grows, consisting of spruce, birch, poplar, tamarack, and willow.

The third party ran portions of the 19th and 20th base lines just east of the Fourth meridian in the drainage area of Churchill river. The original forest growth has been burned off and the district has so often been fire swept that the accumulation of mould is nowhere deep. A large block along the 20th base line (north boundary of township 76) contains considerable good land. The surface is generally rolling, and the district is most suitable for ranching as good hay grows almost everywhere, especially in the fire swept areas. Along Beaver and Churchill rivers are numerous rapids, and in many cases the fall is such that a large amount of power could be developed. This may yet prove very valuable.

TOWNSHIP SUBDIVISION.

The subdivision of townships was again carried on under daily pay, work by contract having been discontinued. The results give additional proof that the present method is much more satisfactory in every way.

Fifteen parties were engaged on regular subdivision, one operating in Manitoba, three in Saskatchewan, and eleven in Alberta. The trend of settlement was found to be still strongly towards the Peace river district, due partly to the large amount of desirable land in that locality and partly to the newly-constructed line of the Edmonton Dunvegan and British Columbia railway. As a consequence, nine of the eleven parties operating in Alberta were scattered over that district, one of these being southwest of Lesser Slave lake, two southeast of Dunvegan, two in the Peace River block, and four in the Peace river valley north of the town of Peace River. Of the remaining two parties in Alberta, one was working southeast of Lac La Biche and the other along the line of the Alberta and Great Waterways railway, now being constructed. When this line has been completed to McMurray a decided impetus will be given to the settlement of that district.

The three parties in Saskatchewan were working north of Prince Albert. To facilitate settlement around Torch and Candle lakes the Provincial Government is improving the road leading to the district from the south.

The party in Manitoba subdivided lands along the east shore of lake Winnipeg in the vicinity of the mouth of Bloodvein river.

REGULAR TOWNSHIP SUBDIVISION, 1916.

Surveyor.	Total mileage.	*Total cost.	Cost per mile.
		$	$ cts.
Baker, J. C.	504	18,396	36 50
Brenot, L.	428	19,265	45 01
Buchanan, J. A.	599	17,413	29 07
Christie, W.	465	15,793	33 96
Fawcett, S. D.	497	18,875	37 98
Glover, A. E.	447	17,908	40 06
Jackson, J. E.	436	12,902	29 59
Johnston, J. H.	538	18,413	34 22
Knight, R. H.	532	18,224	34 26
Lighthall, A.	557	17,838	32 02
McEwen, D. F.	504	17,745	35 21
McGarry, P. J.	458	17,827	38 92
Norrish, W. H.	436	18,229	41 81
Pierce, J. W.	608	15,690	25 81
Seibert, F. V.	686	18,271	26 63
	7,695	262,789	34 15

* Total cost includes depreciation of the outfit used,

The comparison between subdivision under contract in 1914 and subdivision by day work in 1915 and 1916 is given below:—

Year.	Method.	No. of Parties.	Miles surveyed	Total cost.	Cost per mile.
				$	$ cts.
1914	Contract	18	7,686	229,303	29 83
1915	Day work	19	8,612	260,592	30 26
1916	Day work	15	7,695	262,789	34 15

The above statement shows the cost per mile of subdivision surveys under daily pay in 1916 as being four dollars and thirty-two cents more than for contract work in 1914. The chief reason for this is that in 1916 for the first time, levels were taken in connection with the subdivision by all of the regular parties engaged on this work; the cost is included in the total cost of survey, and is approximately three dollars per mile for the total miles of subdivision. In 1915 levelling was carried on by only four of the parties, and in order that a comparison of the parties could be made on an equal basis, the cost of levelling was deducted.

If the same deduction were made for 1916 the comparative costs would be as follows:—

1914	Contract	$29 83
1915	Day work	30 26
1916	Day work	31 15

Since 1914 the increase in the prices of food is 30 per cent, survey labour 25 per cent, equipment and other expenses 10 per cent, an average of 22 per cent. A survey which, under contract, cost $29.83 in 1914 would have cost $36.39 in 1916, while the actual cost for the same survey by day work was only $31.15. The result is most gratifying.

In addition to the fifteen parties engaged on regular subdivision, five parties were employed in the railway belt of British Columbia on subdivision, traverse, and resurvey. Three parties were also engaged making subdivision surveys in northern Manitoba, where only small portions of the townships were required for settlement.

INSPECTION OF SURVEYS.

The abandonment of the contract system of performing subdivision surveys has greatly reduced the cost of inspection. In the past, five or six inspectors, each with a party, were engaged all or part of the season; last season only two surveyors were employed on this work, having no regular party with them and having only such assistance as was required for transportation, etc. Formerly only the parties working under contract were inspected, these being engaged on regular township subdivision. Under the present system an inspection is made of all the parties in the field. But though the number of parties examined has increased, the work of inspection is much less. In the past a considerable number of the surveyed lines in each township had to be checked for chainage and bearings to make sure that the work had not been carelessly performed. As contractors were paid according to the number of miles surveyed, there was every incentive for them to sacrifice accuracy for speed. Under the present system of daily pay there is no reason for the surveyor to slight his work, and the method of inspection has been modified to suit the changed conditions. The inspector now examines the surveyor's work by observing the actual methods employed in the various operations of chaining, levelling, turning angles, building monuments, offsetting survey posts, cutting out and blazing lines, etc. He furnishes a report on the methods of survey and of keeping the field notes and accounts, the instruments and equipment, and on the organization, general management, and efficiency of the party. In addition to this, the inspectors attend to the disposal of worn-out and unused outfits, the arranging for the wintering of the horses and other general business of this nature.

WATER AREAS.

The object of the stadia surveys is to revise quickly and at a moderate cost the survey of rivers, lakes and other bodies of water in townships subdivided many years ago. The drying up of these bodies of water has rendered the old township plans

unsatisfactory for the issuing of patents, and traverses of these bodies are necessary before new plans can be issued. Eleven surveyors were employed on stadia traverses in Saskatchewan and Alberta. They also reported on the progress of settlement, the amount of land under cultivation, the progress of grading on road allowances, and the condition of the survey monuments encountered.

The following table gives a synopsis of their work for the season:—

Surveyor.	Number of townships.	Areas reported on	Lakes traversed.	Mileage of lakes.	Mileage of rivers.	Mileage of tie lines.	Mileage of retracement.	Total mileage.	Total cost.	Cost per mile.	Cost per township.	Cost per lake.
									$	$ cts	$ cts	$ cts
Bennett, G. A.	71	554	356	544	131	135	8	818	6,148	7 51	86 59	13 98
Bowman, E. P.	38	118	305	479	189	173	47	888	5,965	6 72	156 97	14 02
Boulton, W. J.	81	0	344	446	308	143	38	935	6,496	6 94	80 20	11 17
Cowper, G. C.	93	81	88	195	190	42	16	443	5,843	13 19	62 83	33 63
Davies, T. A.	38	180	333	558	0	120	10	688	5,582	8 11	146 88	16 76
McKnight, J. H.	30	55	334	681	36	101	7	825	5,667	6 87	188 90	16 11
Palmer, P. E.	76	114	133	151	352	93	94	690	6,011	8 71	79 09	13 57
Rinfret, C.	82	142	288	368	64	83	59	574	6,293	10 96	76 74	19 89
Scott, W. A.	76	252	286	344	205	100	20	669	5,716	8 54	75 21	12 52
Soars, H. M. R.	33	145	328	556	107	88	6	757	5,736	7 58	173 82	14 66
Walker, C. M.	34	51	374	492	6	120	22	640	5,712	8 93	168 00	15 09
	652	1,692	3,169	4,814	1,588	1,198	327	7,927	65,169	8 22	99 95	15 46

ALBERTA—BRITISH COLUMBIA BOUNDARY.

The delimitation of the interprovincial boundary between British Columbia and Alberta, commenced in 1913, was continued under the same arrangements as for the preceding year. Mr. R. W. Cautley, D.L.S. and A.L.S., who acted for the Dominion and Alberta was employed on the actual work of establishing the boundary and erecting the monuments, while Mr. A. O. Wheeler, B.C.L.S., who represented British Columbia, made a photo-topographical survey of the surrounding country. The boundary was defined last season through Palliser, White Man, and Assiniboine passes, this completing the survey from the international boundary to the main line of the Canadian Pacific railway. The report of the commissioners for this part of the work is now being prepared and will probably be issued during the present calendar year.

SETTLEMENTS AND TOWNSITES.

This work was very limited last season. Small settlements were surveyed at Birch River, Norway House, Carrot River, Menisino, and Bedford Station in Manitoba, together with a few scattered lot, cemetery, and townsite surveys in the other provinces.

TIMBER BERTHS AND MINERAL CLAIMS.

Two timber berths and parts of three others, comprising thirty-six miles of boundary, were surveyed.

Before patents can be issued for mineral claims they must be surveyed by a duly qualified Dominion Land Surveyor under instructions of the Surveyor General. Forty-one claims were surveyed, the majority being gold-mining claims in Manitoba in the vicinity of Herb lake northeast of Pas, and Rice lake east of the southern part of lake Winnipeg.

RETRACEMENT AND RESURVEY.

Townships which were subdivided twenty-five or thirty years ago were not as carefully done as at present. In many cases also no trace of the original survey can be found. Even where the survey was marked by iron survey posts of the old style these were often removed by persons ignorant of their importance, or by those interested in destroying evidences of the survey. Although there is a $50 reward for evidence of this offence few convictions have been secured, and posts are still being displaced. When the survey marks are removed it is difficult for the settlers to find their boundaries, and it is the policy of the department to renew the monuments where the lands cannot be located. This is done only in cases where at least part of the lands affected are still vested in the Dominion.

In some cases the original survey was poorly executed, and a quarter-section returned as one hundred and sixty acres was often as much as forty acres over or under that area.

The correction of these errors is made under the authority of section 57 of the Dominion Lands Surveys Act, and the restoration of obliterated monuments under section 58 of the same act. The Department of Justice has recently ruled that these sections are not applicable to lands which have passed from the Dominion prior to the date on which the act was assented to, unless authorized by the legislature of the province in which the lands are situated. The provinces of Saskatchewan and Alberta have passed acts authorizing these surveys but Manitoba has not.

Three parties were engaged in restoring obliterated monuments, retracing old lines, and making resurveys where there was authority for doing so. They retraced or resurveyed 1,369 miles, besides running 110 miles of traverse.

Some of the early surveys of base lines and initial meridians were not very accurate, both in direction and measurement. As these lines are the governing lines of all other surveys a knowledge of their deviations and discrepancies is necessary for the management of the system of survey as a whole. One party was employed retracing old base lines where inaccuracies were suspected, over 500 miles of line being thus surveyed.

Four surveyors, each with an assistant only, were employed in travelling through Manitoba, Saskatchewan, and Alberta, attending to complaints, correcting errors, erecting monuments, and making various adjustments where the amount of work to be done at any one place did not warrant the expense of a survey party. They hired assistance locally when required.

YUKON SURVEYS.

In the Yukon Territory the work is mostly in connection with mining claims and is under the supervision of the Director of Surveys who resides at Dawson. He is assisted in the office by one draftsman.

STATEMENT OF MILEAGE SURVEYED.

The following is a comparison of the mileage surveyed each year since 1914:—

Nature of Survey.	April 1, 1914 to March 31, 1915.	April 1, 1915 to March 31, 1916.	April 1, 1916 to March 31, 191 7.
	Miles.	Miles	Miles
Township outlines	3,270	2,725	1,952
Section lines	7,100	7,524	5,745
Traverse	5,141	7,234	9,706
Resurvey	2,544	3,441	2,355
Total for season	18,055	20,924	19,758
Number of parties	59	53	41
Average miles per party	307	395	482

The number of parties, which, owing to the nature of their work, cannot be included in this statement is nine this year. The survey of the forty-one parties cost $535,024, the average cost per mile being $27.08 as compared with $30.05 in 1915.

OFFICE WORK.

FIRST DIVISION—GENERAL INFORMATION.

The work performed by this division consists, in general, of the answering of requests for information concerning surveys received from the general public and from other branches and departments, the issuing of all preliminary township plans, the entering of all survey returns in the various registers, the issuing of the annual report and other publications of the branch, and special work of various kinds such as the drafting of formal descriptions of land, etc.

Formerly the drafting of instructions for the surveyors in charge of parties in the field was carried on by this division, but a new division has now been formed under the charge of the Supervisor of Field Work and Accounts, and the drafting of instructions, has been taken over by them. The plans and sketches to accompany the instructions, however, are still prepared in this division. These show all information about the section lines already surveyed, as well as about any Indian or forest reserves, townsites, settlements, etc., which are located in the townships to be surveyed. About 3,000 of these plans and sketches are required each year.

The distribution of the publications issued by this branch, including plans, maps, and pamphlets is attended to by this division. The number distributed each year amounts to many thousands.

All returns from surveyors in the field are received here and are entered up in the various registers. They are then sent on to another division for examination and compiling, after which they are returned for the purpose of being placed on record.

Formal descriptions for insertion in land patents and licenses of occupation are drafted by this division, especially in cases where the boundaries of a parcel are very irregular and the descriptions consequently complicated.

Since the first Manual of Instructions for the Survey of Dominion Lands was issued in 1871 there have been many changes in the character of the boundary monuments erected at township, section, and quarter-section corners. The importance of having exact information in regard to such monuments cannot be over-estimated, both for the surveyors in the field engaged on resurveys and similar work, and for the office staff in dealing with the returns of old surveys. In the past such information was not readily available as it existed only in the old manuals of which very few are now to be had, and in the old departmental reports. A pamphlet has been prepared entitled "Description of Boundary Monuments Erected on the Survey of Dominion Lands, 1871-1917," giving complete information as to the character of all monuments used year by year on Dominion Land surveys since the beginning of the season of 1871. The pamphlet is fully illustrated and indexed, and will be of great value for office work. It should also be of material assistance to all surveyors engaged on surveys in the western provinces. It is now almost ready for the printers, and will probably be issued in about three months.

In addition to the annual report of the branch and the pamphlet on boundary monuments, two other publications were issued. One is the third edition of the pamphlet entitled "Description of the Surveyed Townships in the Peace River District in the Provinces of Alberta and British Columbia." The other publication, issued for the first time, is the "List of Maps and Publications Issued by the Topographical Surveys Branch and Available for Distribution."

The preparation of an index of the maps in the collection of the Geographic Board has been undertaken. These maps, more than 1,000 in number, include charts covering Canadian waters published by the British Admiralty, the Canadian Hydrographic Survey, the United States Lake Survey, the United States Coast and Geodetic Survey, and the French Admiralty; maps published by the Department of the Interior, the Geological Survey, the Department of Militia and Defence, the Provincial Governments; and maps from other sources.

The index will be in two different forms, one graphical and the other numerical. The first will consist of eleven sheets or maps about fifteen inches by twenty-one inches. These will show only the most important topographical features of the country, and will have the various maps plotted on them in the form of rectangles. Sheet No. 1 will be of the whole Dominion, on a scale of about 200 miles to an inch, and will show maps of which the largest dimension covers at least 400 miles. The other ten sheets which are on larger scales and which, combined, cover the whole Dominion, will show the smaller maps in the same manner. The numerical part of the index will contain a list of all these maps arranged according to the numbers assigned them on the graphical index, and giving for each map the title, publisher, size, scale, and the year of publication. The work is now well in hand, and will be ready for the printers in two or three months.

SECOND DIVISION—EXAMINATION OF RETURNS OF SURVEY.

The British Columbia surveys division having been merged into this division, the work now comprises the examination of the returns of survey of all Dominion lands, together with the preparation of all official plans thereof. It includes the examination of topographical and boundary surveys, of all mineral claim surveys, and of all plans of railways and provincial roads.

In the early part of the year the staff is engaged upon the examination of the surveys of the preceding year. In the summer and autumn, the surveyors' progress reports and the stadia surveyors' field notes and plots are received and examined. As in past years, a number of the stadia surveyors came into the office for about three months during the winter to assist with the preparation of the official township plans showing their work.

The official plans now indicate by what surveyor each monument was erected or last restored. This additional information adds greatly to the value of the plans but takes considerable time to procure. This is especially the case in the surveys in the railway belt in British Columbia which are often quite complicated, a large number of surveyors having worked within the area shown on a single official plan. In the past a small additional survey could be added to the previously compiled plan in a short time, but with the introduction of the new method it becomes necessary to investigate each monument shown on the previous plan, besides adding the new survey. As a result the number of plans completed this year, 795, is considerably less than in former years, although a large number of others are in various stages of preparation.

An arrangement has now been adopted whereby certain plans of survey of Dominion lands previously objected to by the Manitoba Land Titles Office may now be brought under the operation of the Real Property Act, and the patentees may obtain certificates of title.

The maps and report of the Commission for the survey of the boundary between Alberta and British Columbia were examined and prepared for publication. The report, which covers the work of four years, will be issued at an early date.

The maps of the Jasper Park, Crowsnest Forest, and Waterton Lakes Park Surveys were also examined and prepared for publication.

Another increasing part of the work is the preparation of special plans of quarter-sections for the Land Patents Branch. Cases arise where the plan of a township does not correctly show some particular quarter-section for which it is required to issue patent. It may not be feasible to issue a new township plan, but a plan of the particular quarter-section is compiled, sufficient copies being made by hand in the Drafting Division for attaching to the patent sent to the Registrar of the Land Titles Office, and to the copy of the patent registered in the department, as well as for those offices where the plans are necessary for reference.

A record of the mileage of the provincial road plans examined has been kept; it shows a mileage of 883 for the 576 plans examined. Owing to the unsatisfactory plans of the Battleford-Swift Current trail, surveyed for the most part before subdivision of the townships, it was in many cases impossible to determine through which quarter-sections the trail actually passed. The whole trail, 183 miles in length, has been re-plotted from the original field notes and from ties shown in the subdividers' field notes, with very gratifying results.

Railway plans to the number of seventy-five were examined, the total mileage being 861. The work on Yukon maps has been continued in the district north of Tantalus and west of Dawson.

The reports from the travelling inspectors on the personnel, organization, efficiency, and work of the survey parties are noted and where any recommendations are made concerning the conduct of the survey such recommendations are communicated to the surveyors.

Considerable time was devoted in co-operation with the inspector of surveys amending the method of subdivision of townships and the consequent revision of the Manual of Surveys, and to the design and preparation of new and suitable blank field books for the use of surveyors in the field.

THIRD DIVISION—DRAFTING.

In other divisions of the branch, returns of survey are examined and plans compiled. Naturally the compiler's chief concern is the collecting of accurate information, such matters as neatness, arrangement, lettering, and appearance being secondary. The work of the Drafting Division consists mainly in re-drawing these plans neatly for photographing for reproduction.

Additions have been made to the office equipment which greatly facilitates this work. They consist of a new tracing frame and a card index.

The tracing frame is larger than any previously used. The light is shut out by a curtain suspended from the ceiling in the form of a rectangle enclosing the frame, and leaving a clear space of about two feet on all sides of it. Above and below the curtain are open spaces to permit the air to circulate freely and give good ventilation. The advantages of this form of curtain over the hood type in which the curtain is quite close to the draftsman are apparent. The card index system has been adopted for recording township plans while being prepared for printing, and in connection with it a follow-up system traces the progress of all printing, through the various stages of drafting, photographing, proving, and printing.

The great majority of the plans drafted are plans of townships. To facilitate the work, printed forms of the roads, section numbers, and quarter-section lines of a regular township are used, requiring only the addition of the topography and the descriptive and numerical data. Townships, in part irregular, are re-drawn on a regular form printed in pale blue so that it is necessary for the draftsman to draw in black the regular part of the survey as shown in blue, and to depart from the standard blue form only where irregularities occur. The plans are reproduced by photography so that any of the blue form which has not been made black does not photograph.

At the end of last fiscal year there were 509 plans of townships on hand to be prepared for photographing. These have all been done, together with most of those received from the compilers during the year, so that we have now only 109 on hand. During the year 1,150 have been prepared, a number about 300 in excess of any previous year's work. This is accounted for by the clearing up of the large amount of work on hand at the beginning of the year.

Surveyors' sketch maps have been drawn and printed in the same way as last year, i.e. colours and symbols are used to describe the soil, timber, and other vegetation. The maps show the profiles along 960 miles of base lines surveyed, and the general character and topography of 654 townships or 23,544 square miles adjoining these lines.

The contour map of Jasper and vicinity, in four sheets on a scale of 1:10,000 or 6·336 inches to a mile with contour intervals of ten feet in the more level portions and twenty feet where slopes are steep, has been printed in four colours for office use. The map of Crowsnest Forest and Waterton Lakes park in five sheets, scale 1:62,500 or 1·014 inches to a mile with contour interval of 100 feet, is still with the printers but may be expected shortly. A third map of the central part of Jasper park in six sheets with scale and contour interval similar to the Crowsnest Forest map is also well under way. Astronomical Field Tables for use of Dominion Land Surveyors were prepared as in previous years, and also a number of such tables modified to suit the requirements of surveyors not operating on Dominion lands. Twenty-nine plans to accompany orders in council, eleven jobs of printing on the small Gordon press, twenty-three miscellaneous plans, and thirty-six other miscellaneous jobs were completed. The sectional maps are still distributed by one of the clerks of this division who also checks the stock from time to time so that the maps may be reprinted if necessary.

FOURTH DIVISION—MAPPING.

In the compiling room eight new sectional maps were prepared covering territory recently reached by base line surveyors. Three of these new sheets are in the region of lake Winnipeg and the other five are in northern Alberta. The area thus for the first time mapped with some degree of accuracy is about 30,000 square miles, being considerably larger than the province of New Brunswick. Revised editions were made of seventeen sheets and six others are in hand. The total number of sectional maps is now 128 covering an area of approximately 500,000 square miles.

In the surveys office at Calgary a scheme of contour lines is being worked out for all sectional maps covered by the network of base and meridian lines on which accurate levels have been taken. The contour interval is twenty-five, fifty, or one hundred feet, depending on the nature of the country. Five maps have been dealt with, three being new sheets and the other two revised editions. The contour lines will be shown in brown and will replace the hachures at present in use on the maps.

The method adopted two years ago of finding out the exact location of post offices and railway stations by sending diagrams to the postmasters, has been continued and with good results. Nine hundred and fifty diagrams of post offices on twenty sectional maps were sent out, and nine hundred and five were returned corrected.

Other work done in the office, but not directly connected with sectional maps, was as follows:—

(1) The surveyors' reports received from April 1, 1915, to March 31, 1916, were prepared and printed in five pamphlets containing 170 pages. The preparation of reports for the year ended March 31, 1917, is well advanced.

(2) The sixth volume of reports of surveyors, being extracts from reports for townships 17 to 32, west of the Second meridian, is in hand, but progress is slow as only one man can be spared for the work and that for only part of the time.

(3) Parties employed on the survey of base and meridian lines penetrate far beyond all previous surveys and often reach districts of which very little is known. For this reason there is attached to every party an explorer whose duty it is to explore for twelve miles on each side of the line as the survey progresses. From the explorer's reports and sketches, combined with the returns of the survey of the line, a "sketch map" is made up showing the topography of the country along the line and for twelve miles on each side, with copious notes to indicate the kind of timber, the nature of the soil, etc. A scheme has been devised by which this information is shown by tints and symbols, and the notes which so tend to disfigure the maps have been reduced to a minimum. Three maps were worked out on this basis and accompany this report. They represent 568 miles of line run and cover an area of approximately 12,500 square miles.

(4) Eleven odd jobs were undertaken, the time required for each varying from one-half day to one week.

In the drafting room where the compiled maps are drawn for reproduction by photo-lithography one man has been engaged exclusively on maps of the Alberta-British Columbia boundary and the remainder on the sectional maps, preparing new sheets and revised editions for publication.

FIFTH DIVISION—SPECIAL SURVEYS.

Base Line Surveys.

Three parties were engaged in the survey of base lines. The required information for these surveys was prepared and the returns of survey are being examined. For several years past surveys of governing lines have been carried on within a fertile belt of twenty-seven million acres through which flow the lower waters of the Peace and Athabaska rivers. This block lies between the Fourth and Sixth meridians, and extends from township 88 to township 112. Surveys of governing lines in this block are now almost completed, four base line closings having been made therein during the past year. Of Dominion Lands surveys, those in this block are farthest north, the 29th base between the Fifth and Sixth meridians being 676 miles north of the international boundary, while the Sixth meridian has been produced to a point eighty-seven miles still farther north. Where the surveys have extended to such great distances there is danger of accumulations of error and consequent misplacement of monuments. Considerable care therefore has been exercised, and time spent in checking the records

of these surveys to ensure the establishment of monuments as nearly as possible in their correct latitudes. Some required adjustments in the positions of corners in this block were recommended, and these were made during the survey of the lines. The results of the surveys in this block are very satisfactory, monuments being very nearly in correct latitudes, and the majority of the closings agreeing very well with the computed values.

Some time was required for keeping the records of mounments erroneously established, computing the changes required for the correction of these, and registering when and by whom these corrections were made. Three surveyors received instructions for the correction of monuments originally placed in error.

Over 500 miles of old base lines and meridians were retraced during the year. The required information for these surveys was prepared and the returns of survey are being examined. These retracements were required in connection with the examination which is being made of old bases and meridians, and a report on this work is being prepared. No latitude observations with the zenith telescope were made during the year.

Astronomical Work.

Azimuth Observations.—All the azimuth observations taken on base lines and meridians during the summer season of 1915 and the winter season of 1915-16 have been received at this office and examined. This examination consisted of the checking of 1,275 individual observations on Polaris taken at 450 stations and controlling the bearings of over one thousand miles of original governing survey lines and seven hundred miles of retracement survey lines. The average length of line depending on a set of observations has during the past season been reduced to 3·8 miles. This fact is considered worthy of notice, especially when the speed at which the line is now produced is taken into consideration, as it necessitated the taking of a set of azimuth observations on almost every second day that the line was being produced. The following table gives a comparison of the results obtained during the season of 1915 with preceding years in triennial periods:—

	1909.	1912.	1915.
Average correction per mile of line..	5″·5	2″·1	1″·6
Miles of line per azimuth station...	4·3	4·5	3·8
Average number of observations per azimuth station.	1·6	2·6	2·8
Average range of observations at an azimuth station.	17″	9″	9″

This comparison shows that while very marked improvement took place in the earlier years of close supervision by this office over the work in the field, only a merely noticeable improvement has been obtained since. This fact would seem to indicate that further improvement in the work of the surveyor as regards azimuth observing and the accurate production of the line in bearing cannot reasonably be expected and indeed such improvement is not in any way necessary as the work now being done is considered well within the limits which practical considerations indicate as desirable.

Astronomical Field Tables.—The tables giving the right ascension and declination of the sun, and those tabulating the azimuth of Polaris were compiled and printed. A change in the latter was made to reduce somewhat their maximum error.

The general method of determining the azimuth of a line is to measure the angle between a mark on the line and one of the heavenly bodies, to compute the azimuth of the latter at that time, and from this to compute the azimuth of the line. For this purpose the tables of the Topographical Surveys were compiled, giving the azimuth of the Pole Star without any computation other than interpolation for latitude and time. The azimuth depends on the right ascension and declination of Polaris, the latitude of the place, and the hour angle of the star, the first two of which, in computing the tables, are considered constant, the other two variable. But this assumption is not strictly correct, and for a fixed latitude and time, the azimuth is varying

slightly from day to day. To assume a mean position of the star for a certain period produces an error, the magnitude of which depends on the period chosen. Some time ago, the position of the star during November and December, September and October, and July and August of three consecutive years was such that a mean position for this period introduced an error sufficiently small for the purpose of these tables, but gradually changes in the path of the star have caused this error to increase to such an extent that during the past year the grouping of months has had to be changed. The periods are now chosen in such a way as to give a minimum error for periods involving approximately six months, one set giving two months in each of three consecutive years, the other giving three months in each of two consecutive years. The arrangement is not as simple as the former one as it involves fractional months. but the maximum error has been decreased by about one-fifth. These new tables will be used after August, 1917.

Typical periods are:—

October 8 to December 14, 1916.
August 14 to October 6, 1917.
June 2 to August 9, 1918, and
December 15, 1917 to March 10, 1918.
March 9, 1919 to June 2, 1919.

Most surveyors and engineers in the past have dreaded azimuth determinations of any kind; observations were looked upon as a terrible ordeal, were dispensed with as much as possible, and were taken only when considered absolutely imperative. The two methods most commonly adopted for determining the azimuth of a line were by means of the sun and of Polaris at elongation. Observations by means of the sun have the great advantage that they are of course always taken in daylight and may be taken at almost any time in the summer months, except within say two hours of noon; they have the great disadvantage in that they are not very accurate, and the computations are long. The observation on Polaris at elongation is both easy to take, simple to compute and accurate in results, and land surveyors who desired accuracy in their work have adopted it almost universally in the past. It has the great disadvantage however, that, as elongation takes place only twice in twenty-four hours, the observation can be made at only two particular times of the day, and as one of these times is generally unsuitable on account of strong daylight and the consequent difficulty in seeing the star, in practice it generally happens that the observation can be made only once a day; if the weather conditions should, as may very likely happen, be unfavourable at that particular time the opportunity for observing is gone for another twenty-four hours. This is one of the main reasons why for some time back it has been the practice among an ever increasing number of surveyors and engineers to observe on Polaris at any time. The method, except when the star is close to upper or lower culmination is just as accurate as the elongation method but entails considerable computation. To overcome this, various forms of tables have been prepared. One form gives the azimuth with the hour angle and latitude as arguments, the declination being considered constant. A table of corrections for change in declination is also required. This form therefore requires the calculation of the hour angle from the watch time by means of a table giving the right ascension or the time of elongation by the star, double interpolation in the main table for hour angle and latitude, and a correction to this for change in declination, the last requiring also a table of declinations. Another form of table even less simple, is to compute the hour angle as above, interpolate in the table supplied for this value and for the year of the observation to obtain the approximate value of the azimuth, and interpolate in another table for this approximate azimuth and for the measured altitude to obtain a correction to the former. These tables are all arranged so as to be suitable for many years and are a great convenience over the actual computations, but the double interpolations and the various correction tables make them clumsy to use.

Frequent azimuth observations are one of the primary necessities for accurate work. Now if the taking of these observations can be made so simple and easy that surveyors will think nothing of them, a big step will have been made in raising the standard of survey work. About fourteen years ago the Surveyor General took the problem in hand. Transits were designed with telescopes sufficiently powerful to permit of the star being seen clearly in daylight and tables were issued by means of which the azimuth was derived in a much simpler manner than in the tables described above. They have been in general use on Dominion Lands surveys ever since and, taken in conjunction with the observing of Polaris in daytime, have been generally conceded among surveyors to have been one of the greatest, if not the very greatest, improvement ever made in Dominion Lands surveys.

Although the tables have been prepared for the Dominion Lands system of township surveys and are not very convenient for any other purpose, their use has been increasing for some years among surveyors and engineers other than those engaged on Dominion Lands surveys. Last year, the Minister of the Interior was requested by the Minister of Lands, Forests and Mines for Ontario, on behalf of the Ontario Land Surveyors Association, to issue astronomical field tables of the same kind, but modified to be convenient for these other Canadian surveyors and engineers. The preparation of the tables was authorized by the minister and five sets similar to those used on Dominion Lands surveys but extending from latitude 42° to 56° and having the latitude instead of the township as argument, have been computed.

MAGNETIC SURVEYS.

In 1916, fifty surveyors were instructed to observe for magnetic declination, and on the surveys of R. C. Purser, D.L.S., and E. S. Martindale, D.L.S., observations for magnetic dip and total force were taken at thirty-eight stations.

The data obtained during 1916, together with a discussion of all the magnetic data obtained to date, accompanied by various magnetic maps will be published in monograph form.

SURVEYING INSTRUMENTS.

All instruments used on surveys are required to be of approved pattern and in good condition.

A list of the instrumental equipment of the surveyors employed in the field was compiled, and where it was thought advisable the instruments were inspected and repaired.

Repairs were made to seventy-three transit theodolites, forty-three levels, four surveying aneroids, two dip circles, twenty-three levelling rods, fifty-one stadia rods, seven rod levels, and ten tripods.

Twenty sidereal watches were overhauled and readjusted.

In connection with the inspection of instruments and outfitting of the surveyors, 349 cases aggregating 8 tons (16,085 pounds), were shipped from this office and 214 cases aggregating 6½ tons (12,843 pounds), received.

A statement of instruments on hand on March 31, 1917, showing also the instruments purchased and sold during the year is given in Appendix 13 to this report.

GENERAL WORK.

A contract was let for the supply of 30,000 survey posts to be used in the field during 1916. The post consisted essentially of a thirty-inch length of standard one-inch pipe with a malleable iron foot-plate on the bottom and a bronze cap on the top—the bronze cap carrying the inscription PENALTY FOR REMOVAL, SEVEN YEARS IMPRISONMENT, and a crown. The completed post was then dipped in Mexican asphaltum, after

which it was filled with concrete consisting of equal parts of Portland cement and sand. The posts were packed in basswood crates holding ten posts each, for transportation purposes.

A representative from this division was deputed to oversee the manufacture of these posts, and this innovation resulted in work eminently satisfactory to both the manufacturer and the department.

Another contract has been let for 30,000 survey posts to be used in the field during 1917. The inscription on the bronze cap has been enlarged by the addition of the words DOMINION LANDS SURVEYS. Several improvements have been made in the design of the post, and the practice of deputing a representative to oversee the work has been continued.

Experiments have been made with the object in view of still further improving the design of these posts. The possibility of brazing on the bronze caps and welding on the foot-plates with the oxy-acetylene blow-pipe has been investigated, as has likewise the possibility of metal coating the outside of the post with zinc or copper to supersede the Mexican asphaltum at present in use.

A special short survey post for planting in rock has been designed and manufactured. In order to ascertain the best method of planting these posts, a piece of the hardest granite was obtained and the different surveyors in the city were invited to experiment for themselves and submit their opinions. As a result it would appear that little difficulty will be experienced in complying with the instructions which have been issued for planting these posts.

A special townsite post having a bronze cap on the top and a foot-plate on the bottom has been designed, the inscription on the cap being DOMINION LANDS SURVEYS.

All the surveyors in the field were circularized in regard to the best methods of planting and marking the standard survey posts. This has resulted in several improvements being effected.

A general review is being made of methods of rapidly solving the astronomical triangle for time-azimuths and altitude-azimuths, covering tables, solar attachment, calculating devices, abaci, nomograms, etc. This interesting matter is expected to be ready in the near future.

SURVEYS LABORATORY.

Complete tests were made of ten D.L.S. subdivision transits and seven clinometers. Partial tests were made of sixty-eight subdivision transits and fifteen levels. Twelve aneroid barometers were examined and a determination for index correction made; four aneroids were subjected to complete tests in accordance with the Bureau of Standards method, and certificates issued.

Tests were made for the War Purchasing Commission of Canada of thirty-three engineer's transits and twenty-three engineer's levels, and certificates issued for twenty-nine of the transits and twenty-three levels, the remaining four transits having been rejected.

Seventy-two sidereal watches were submitted for trial and sixty-six of these passed through complete tests; the remaining six stopped before the tests were finished. Five of the watches which stopped were repaired and later passed through complete tests. All watch tests are now made in accordance with the Bureau of Standards method for a class A certificate. Of the sixty-six watches completing the test, twenty-nine or forty-four per cent passed.

During the year one hundred and four stadia cards were computed, printed and issued to the surveyors.

The work done at the Surveys Laboratory is given in more detail in Appendix 12 of this report.

PHOTOGRAPHIC OFFICE.

Considerable time was spent reproducing the Crowsnest Forest Reserve and the interprovincial boundary maps which are printed in four colours. The black plates are

engraved on copper and transferred to zinc. The brown, blue, and red plates are photographed from the original drawing and printed direct on zinc.

A departure has been made from the ordinary practice in issuing the map of the central part of Jasper park in six sheets; the black has been carefully drawn by expert draftsmen and photographed direct for the press.

Photography is being used throughout for this map and the final results can hardly be distinguished from engraving.

The schedule in Appendix No. 3 shows an increase in the number of negatives over last year, caused by the large number of township plans issued during the latter part of the year.

Blue-print proofs from all negatives are now taken and if any errors are found correction is made on the negative before printing on zinc.

The amount of enlarging and printing was less than usual, due in a great measure to the falling off in photographic surveys.

Further experience with panchromatic dry plates which were tried out the previous season has proved them to be well adapted to photo-topographical surveying. The results obtained from these negatives both in the enlargements used for plotting purposes and the contact prints are all that can be desired.

A system which dispenses with much of the mounting of prints has been introduced. The small negatives are masked and printed on paper large enough for binding in covers, being made in this way into a loose-leaf album. While the saving in time is not great, the result is very neat and convenient.

GEOGRAPHIC BOARD.

The Geographic Board consists of eleven members appointed from the different departments at Ottawa and one member from each of the provinces. The secretary is an officer of the Department of the Interior.

The regular meetings of the board are held on the first Tuesday of every month, and all questions concerning geographic names in the Dominion which arise in the departments of the public service are referred to it. The names and orthography adopted by the board are to be accepted and used by all the departments in their publications.

The decisions of the board are published after each meeting in the *Canada Gazette* and also in bulletin form.

The report of the board is issued as a supplement to the report of the Department of the Interior. This report contains all decisions of the board since its inauguration and also its rules of nomenclature.

Besides attending to the correspondence of the board the secretary has prepared historical notes for a guide book to Jasper Park which will soon be published.

BOARD OF EXAMINERS FOR DOMINION LAND SURVEYORS.

The Board of Examiners for Dominion Land Surveyors held two meetings during the year.

The first was a special meeting lasting from May 1 to June 2 (inclusive), 1916, during which examinations were held at Ottawa, Toronto, Calgary, Edmonton, and Vancouver. The second was the regular annual meeting called for by section 9 of the Dominion Lands Surveys Act. It began on February 12, 1917, and lasted until March 15, 1917. During this meeting examinations were held at Ottawa, Toronto, Kingston, Calgary, Regina, Edmonton, and Vancouver. The total number of candidates for examination was 125. Of these 88 tried the preliminary examination, 35 tried the final examination and 2 tried the examination for Dominion Topographical Surveyor.

Twenty-nine candidates were successful at the preliminary examination, as follows:—

Bone, Allan Turner, Calgary, Alta.
Bush, Harold Frederick, Ottawa, Ont.
Donevan, Frederick James, Lansdowne, Ont.
Fetterly, Philip Austin, Calgary, Alta.
Fraser, John Donald, Ottawa, Ont.
Godwin, Dalton George, Ottawa, Ont.
Howe, John Parnell, Pembroke, Ont.
Johnston, George Wm. Frederick, Ottawa, Ont.
Lamert, Eugene, Montreal, Que.
Lawson, Horace Hetherington, Kingston, Ont.
Marchand, Eugene Francis, Ottawa, Ont.
Maddock, Charles Orville, Inwood, Ont.
Manning, Ralph Clarke, Hamilton, Ont.
Miller, William Harold, Ottawa, Ont.
McDonald, John Nicholson, Edmonton, Alta.
McDougall, John Lorne, Ottawa, Ont.
McGrath, Walter Neville, Ottawa, Ont.
McKenzie, Gordon Leslie, Ottawa, Ont.
Paterson, Elwin L., Rocklyn, Ont.
Petrie, Edward Archibald, Ottawa, Ont.
Philip, Patrick, Vancouver, B.C.
Quinn, James John, Ottawa, Ont.
Raynard, Kenneth S., Ottawa, Ont.
Russell, Benjamin, Ottawa, Ont.
Samuel, Maxwell, Toronto, Ont.
Snell, Charles Henry, Red Deer, Alta.
Watson, Cyril James, Ottawa, Ont.
Whittier, Albert Ronald, Ottawa, Ont.
Wrong, Gordon, Sandwich, Ont.

Twenty-three candidates were successful at the final examination, as follows:—

Atkins, Cecil Benjamin, Revelstoke, B.C.
Beale, Alfred Martin, Ottawa, Ont.
Bruynseraede, Rene Paul, Edmonton, Alta.
Christie, Gerald Moffatt, Ashcroft, B.C.
Coursier, Eric Clarence, Revelstoke, B.C.
Daly, William Patrick, Ottawa, Ont.
Disney, John Harold, Edmonds, B.C.
Flook, Samuel Evert, Port Arthur, Ont.
Hunt, Septimus, Calgary, Alta.
Joslyn, Cecil Earle, Sintaluta, Sask.
Lamarque, Ernest Charles Wm., Marine Heights, B.C.
Matheson, Alexander, Lorne, Ont.
Martin, Walter Harold, Toronto, Ont.
Meikle, MacKay, Ottawa, Ont.
Moffatt, William James, Vancouver, B.C.
McGugan, Donald Johnston, New Westminster, B.C.
Novion, Leon Marie Lucien, Edmonton, Alta.
Perry, Alfred Melville, Ottawa, Ont.
Rimmer, William Bolton, Vancouver, B.C.
Russell, John, Edmonton, Alta.
Spence, William A., Ottawa, Ont.
Tassie, Gilbert Culloden, Vancouver, B.C.

Twenty-three commissions were issued to candidates who had passed the final examination, and had furnished oaths of office and allegiance and bonds for the sum of one thousand dollars as required by section 25 of the Dominion Lands Surveys Act.

Seventeen certificates of preliminary examination were issued to successful candidates who had complied with the requirements of the law.

Section 35 of the Dominion Lands Surveys Act provides that every Dominion Land Surveyor shall be in possession of a subsidiary standard of length. During the year six new standards were issued to surveyors. One Ontario Land Surveyor, who was also a Dominion Land Surveyor, sent his O.L.S. standard measure to be tested. This measure was found to be in good condition, and after being tested at the Surveys Laboratory was re-issued as a subsidiary standard of length. One standard measure was issued to the Secretary of the Saskatchewan Land Surveyors' Association for one of the members. One D.L.S. standard measure was tested at the laboratory.

APPENDICES.

No. 1. Schedule of surveyors employed and work executed by them.
No. 2. Schedule showing for each surveyor employed the number of miles surveyed of section lines, township outlines, traverses of lakes and rivers, and resurvey; also the cost of the same.
No. 3. Details of office work.
No. 4. Inspection Surveys.
No. 5. Base line Surveys.
No. 6. Subdivision Surveys.
No. 7. Railway Belt Surveys.
No. 8. Stadia Surveys.
No. 9. Miscellaneous Surveys.
No. 10. Yukon Surveys.
No. 11. Levelling.
No. 12. Report on work of Surveys Laboratory.
No. 13. List of surveying instruments on hand March 31, 1917.

MAPS AND PROFILES.

The following maps accompany this report:—

1. Map to illustrate progress of Dominion Land Surveys to March 31, 1917.
2. Map showing topography and profiles of base lines and meridians run during the year.

E. DEVILLE,
Surveyor General.

NOTE.—Appendices Nos. 4 to 13 and the maps accompany the report of the Topographical Surveys Branch in monograph form.

TOPOGRAPHICAL SURVEYS BRANCH.

SCHEDULES AND STATEMENTS.

APPENDIX No. 1.

SCHEDULE of Surveyors employed and work executed by them.

Surveyor.	Address.	Description of Work.
Akins, J. R.	St. Catharines, Ont.	Survey of the following base lines west of the Fifth meridian: the 24th and 25th bases across ranges 22 to 25; the 26th base across ranges 21 to 25; and the 28th base across ranges 19 to 24. Survey of the following base lines west of the Sixth meridian; the 24th base across ranges 1 and 2; the 25th base across ranges 1 to 3; the 26th base across ranges 1, 2, and part of 3; the 27th base across ranges 1 to 3; the 28th base across ranges 1 and 2; and the 29th base across ranges 1 to 6.
Aylsworth, C. F.	Madoc, Ont.	Resurvey in tps. 17 and 18-19-Pr.; tp. 38-28-Pr.; and tps. 37 and 38-29-Pr. Traverse in tps. 17 and 18-18-Pr.; and tp. 18-20-Pr.
Baker, J. C.	Kingston, Ont.	Subdivision of tp. 92-22-5; tps. 92 and 93-23-5; and tp. 89-26-5. Part subdivision of tp. 91-23-5; tp. 93-24-5; and tp. 89-25-5. Survey of the east outlines of tp. 90-25-5; and tp. 90-26-5.
Bennett, G. A.	Tillsonburg, Ont.	Stadia surveys in tps. 31, 32, 33, 34, and 35-1-3; 31, 32, 33, 34, 35, and 36-2-3; tps 31, 32, 33, and 34-3-3; tps. 31, 32, 33, 34, and 35-4-3; tps. 32, 33, 34, 35, 36, and 37-5-3; tps. 31, 32, 33, 34, 35, 36, and 37-6-3; tps. 31, 32, 33, 34, 35, 36, and 37-7-3; tps. 30, 31, 32, 33, 34, 35, 36, and 37-8-3; tps. 31, 32, 33, 34, 35, 36, and 37-9-3; tps. 31, 32, 33, 34, 35, 36, 37, and 38-10-3; tps. 31, 32, 33, 34, 35, 36, 37 and 38-11-3; tps. 33, 35, 36, 37, and 38-12-3; and tps. 36, 37, and 38-13-3.
Blanchet, G. H.	Ottawa, Ont.	Survey of the 19th base line across ranges 18 to 27; and the 20th base line across ranges 10 to 26, west of the Third meridian.
Boulton, W. J.	Wallaceburg, Ont.	Stadia surveys in tps. 15, 17, 18, and 19-13-4; tps. 17, 18, and 19-14-4; tps. 15, 16, 17, 18, and 19-15-4; tps. 15, 16, 18, and 19-16-4; tps. 15, 16, 17, 18, 19, and 20-17-4; tps. 15, 17, 18, 19, and 20-18-4; tps. 15, 16, 18, and 19-19-4; tps. 15, 17, and 19-20-4; tps. 14, 15, 16, 17, and 19-21-4; tps. 14, 15, 18, and 19-22-4; tps. 16 and 17-23-4; tp. 16-24-4; tps. 15, 17, and 18-25-4; tps. 15, 16, 18, and 19-26-4; tps. 15, 16, 17, and 19-27-4; tps. 14, 16, 17, 18, and 19-28-4; tps. 15, 16, 17, and 19-29-4; and tps. 15, 16 and 17-30-4. Retracement in tp. 16-13-4; tps. 15 and 16-14-4; tp. 17-16-4; tp. 16-18-4; tp. 17-19-4; tps. 16 and 18-20-4; tp. 18-21-4; tps. 16 and 17-22-4; tps. 15, 18, and 19-23-4; tps. 15, 17, 18, and 19-24-4; tps. 16 and 19-25-4; tp. 17-26-4; tp. 18-27-4 and tp. 15-28-4.

SCHEDULE of Surveyors employed and work executed by them—*Continued.*

Surveyor.	Address.	Description of Work.
Bowman, E P..	West Montrose, Ont. ..	Stadia surveys in tps. 46 and 47-14-3; tps. 45, 46, 47, 48, 49, and 50-15-3; tps. 46, 47, 48, 49, and 50-16-3; tps. 47, 48, 49, and 50-17-3; tps. 45, 46, 47, 48, 49, and 50-18-3; tps. 45, 46, and 47-19-3; tps. 45, 46, 47, 48, 50, and 51-20-3; tps. 46, 47, 48, 49, and 50-21-3; tps. 46, 47, 48, 49, 50, and 51-22-3; tps. 46, 47, 48, 49, and 50-23-3; and tps. 46, 47, 48, 49 and 50-24-3. Retracement in tp. 51-21-3; and tp. 51-24-3.
Brenot, L.	Ottawa, Ont..	Subdivision of tp. 84-15-6; tps. 83 and 84-16-6; and tp. 81-17-6. Part subdivision of tp. 82-16-6; and tp. 82-17-6. Survey of the east outlines of tp. 81-16-6; and tp. 82-17-6.
Brownlee, J. H..	Dawson, Y.T.	Mineral claim, base line, and miscellaneous surveys in the Yukon Territory.
Buchanan, J. A.. ..	Edmonton, Alta.	Subdivision of tps. 93 and 94-20-5; and tp. 93-21-5. Part subdivision of tps. 95 and 97-19-5; tps. 95, 96, and 97-20-5; and tp. 94-21-5. Survey of the east outlines of tps. 93 and 96-19-5; and the north outline of tp. 93-19-5. Traverse in tp. 94-19-5.
Calder, J. A..	Lytton, B.C..	Subdivision in tp. 22-20-6; tps. 22, 23, and 24-21-6; tps. 22 and 23-22-6; tp. 23-25-6; tp. 23-26-6; tps. 21 and 22-27-6; and tps. 19 and 20-28-6. Traverse in tp. 22-21-6.
Cautley, R. W..	Edmonton, Alta... .. .	Survey of interprovincial boundary between Alberta and British Columbia in Palliser pass; White Man pass; and Assiniboine pass.
Christie, W..	Prince Albert, Sask.. ..	Subdivision of tp. 57-22-2; and tps. 55, 56, and 57-23-2. Part subdivision of tps. 54 and 55-22-2, and tp. 54-23-2. Survey of the east outline of tp. 56-22-2. Traverse in tp. 57-21-2; tp. 58-22-2; and tp. 54-24-2.
Coté, J. M..	Ottawa, Ont..	Miscellaneous subdivision in tps. 31 and 46-12-2; tp. 41-13-2; tp. 37-14-2; tp. 39-15-2; tp. 39-18-2; tps. 31 and 32-28-2; tp. 31-12-3; tp. 33-13-3; tps. 32 and 33-15-3; tp. 33-16-3; tp. 36-18-3; tps. 30, 39, 40, and 49-19-3; tps. 34, 35, 38, and 40-20-3; tps. 31 and 32-24-3; tp. 32-25-3; and tp. 32-26-3. Resurvey in tps. 41 and 42-23-2; tps. 46 and 47-1-3; tps. 45 and 46-2-3; tp. 34-5-3 and tp. 50-25-3. Retracement surveys in tp. 26-9-2; tps. 26 and 27-10-2; tp. 38-22-2; tp. 38-23-2; tp. 41-24-2; tps. 45, 45A, 46 and 47-27-2; tp. 30-28-2; tp. 31-29-2; tp. 48-1-3; tp. 31-16-3; tp. 36-17-3 and tp. 33-20-3. Restoration surveys in tps. 46A and 47-26-2, and tp. 34-12-3. Correction surveys in tp. 34-6-3; and tp. 41-13-3. Lot survey in tp. 44-7-4.
Cowper, G. C..	Welland, Ont..	Stadia surveys in tps. 22 and 33-4-4; tps. 22, 29, 31, 32, 33, and 34-5-4; tps. 22, 27, 28, 29, 30, 31, 32, and 33-6-4; tps. 22, 28, 29, 30, 31, 32, and 33-7-4; tps. 22, 25, 28, 29, 30, 31, 32, and 33-8-4; tps. 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, and 34-9-4; tps. 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, and 34-10-4; tps. 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, and 34-11-4; tps. 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, and 34-12-4; tps. 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, and 33-13-4; tps. 25, 28, 32, and 33-14-4; tps. 33 and 34-15-4; tps. 33 and 34-16-4; and tps. 33 and 34-17-4.

SESSIONAL PAPER No. 25

SCHEDULE of Surveyors employed and work executed by them—*Continued.*

Surveyor.	Address.	Description of Work.
Davies, T. A.	Edmonton, Alta.	Stadia surveys in tps. 37, 41, and 42-28-3; tp. 37-29-3; tps. 37, 38, 39, 40, 41, 42, and 43-1-4; tps. 38, 39, 40, and 41-2-4; tps. 38, 39, 40, 41 and 42-3-4; tps. 36, 37, 38, 39, 40, 41, 42, and 43-4-4; tps. 36, 37, 38, 39, 40, 41, 42, and 43-5-4; tps. 38, 40, 41, 42, and 44-6-4; tps. 37, 38, 39, 40, 41, 42, and 44-7-4; tps. 38, 39, 40, 41, and 42-8-4; and tp. 39-9-4.
Deans, W. J.	Brandon, Man.	Subdivision in tps. 58 and 65-2-Pr.; tps. 57, 58 and 65-3-Pr; and tp. 57-4-Pr. Survey of Elk island in tps. 20 and 21-7-E; Lot surveys at Birch River station in tp. 39-26-Pr; and at Norway House in tp. 57-3-Pr. and tp. 57-4-Pr.
Evans, S. L.	Corinth, Ont.	Subdivision in tps. 19 and 20-4-3; tp. 19-5-3; tp. 74-5-5; and tp. 74-6-5. Retracement in tp. 18-24-2; tps. 18 and 19-25-2; tps. 18 and 19-3-3; tps. 17 and 18-4-3; tps. 18 and 32-5-3; tps. 15 and 16-6-3; tps. 18 and 19-8-3; tps. 17, 18 and 19-9-3; tp. 17-10-3; tp. 18-11-3; tp. 17-14-3; tp. 14-16-3; tps. 19 and 20-17-3; tp. 21-18-3; tp. 56-3-4; tp. 57-9-4; tp. 57-10-4; tp. 59-11-4; tps. 59 and 61-12-4; and tp. 60-18-4. Resurvey in tp. 21-9-3; tps. 19 and 20-14-3; tps. 19 and 20-16-3; tp. 12-17-3; tp. 22-18-3; and tps. 13, 14, and 15-19-3. Correction in tp. 19-22-2. Traverse in tp. 60-6-4; tp. 58-9-4; and tp. 59-11-4. Examination of subdivision surveys made during the season by J. C. Baker, D.L.S.
Fawcett, S. D.	Ottawa, Ont.	Subdivision of tp. 79-17-6; tps. 78 and 79-18-6; and tp. 79-19-6. Part subdivision of tp. 80-17-6; and tps. 77 and 80-18-6. Survey of the east outlines of tps. 77, 78, and 80-20-6. Traverse in tp. 80-19-6.
Fletcher, J. A.	Fletcher, Ont.	Survey of the 29th base line across ranges 7 to 24; and the 30th base line across ranges 8 to 16 and part of range 17, west of the Fourth meridian. Survey of the east outlines of tps. 113, 114, 115, and 116-8-4.
Fontaine, L. E.	Lévis, P.Q.	Subdivision in tp. 41-18-5; and tp. 48-24-5. Correction survey in tp. 50-19-4; and tp. 40-27-4. Retracement survey in tp. 12-19-4; tp. 49-22-4; tp. 1-26-4; tp. 51-27-4; tps. 20, 21, and 28-29-4; tps. 21 and 50-1-5; and tps. 50 and 52-2-5. Traverse in tp. 57-23-4; tps. 23 and 24-24-4; tp. 53-1-5; tp. 58-4-5; tp. 58-6-5; and tp. 26-7-5. Investigation of section lines in tp. 11-1-5. Marking monuments in tp. 24-1-5. Preliminary lot survey in tp. 29-20-4.
Galletly, J. S.	Oshawa, Ont.	Subdivision survey in tp. 55-28-Pr; tp. 55-29-Pr; and tp. 55-30-Pr Survey of road in tp. 55-27-Pr; and tp. 55-28-Pr. Survey of Carrot River settlement in tp. 55-29-Pr; and of timber berth No. 920 in tp. 55-29-Pr; and tp. 55-30-Pr.
Glover, A. E.	Edmonton, Alta.	Subdivision of tp. 75-25-5; tp. 75-26-5; and tps. 75 and 76-3-6. Part subdivision of tps. 74 and 75-24-5; and tp. 74-26-5. Survey of the east outlines of tps. 74 and 76-25-5; tps. 74 and 76-26-5; and part of tp. 74-3-6.
Jackson, J. E.	Hamilton, Ont.	Subdivision of tp. 32-5-E; tps. 30, 31, and 32-6-E; and tps. 28, 29, and part of 30-7-E. Traverse in tps. 27 and 31-7-E; and tps. 27 and 28-8-E. Retracement of I. R. in tp. 32-7-E.

SCHEDULE of Surveyors employed and work executed by them—*Continued.*

Surveyor.	Address.	Description of Work.
Johnston, J. H.	Peace River, Alta.	Subdivision of tp. 86-16-5; tp. 86-17-5; tps. 82, 85 and 86-18-5; tp. 88-19-5; and part of tp. 87-19-5. Survey of the east outlines of tps. 85-87, and 88-16-5; tps. 85, 87, and 88-17-5; and tps. 83, 84, 87, and 88-18-5.
Johnston, W. J.	St. Catharines, Ont.	Subdivision in tp. 21-28-5; tps. 20 and 21-29-5; tps. 20, 21 and 22-1-6; tps. 22, 23 and 24-2-6; tp. 23-3-6; and tps. 22-7-6. Traverse in tps. 21 and [illegible]; tp. 23-2-6; tp. 23-3-6; and tps. 21 and 22-7-6
King, J. A. S.	Ottawa, Ont.	Subdivision in tps. [illegible], tps. 3 and 4-8-Pr.; tps. 16 an[illegible]r.; tps. 15, 16, 17, and 18-11-Pr.; tps [illegible]nd 4-21-Pr.; tps. 3 and 4-22-Pr.; tp. 43-26 Pr.; tp. 44-27-Pr.; tp. 44-28-Pr.; and tp. 44-29-Pr.; Retracement survey in tp. 40-23-Pr.; tp. 28-29-Pr.; tp. 29-29A-Pr.; tp. 10-2-2; tp. 11-3-2; and tp. 11-4-2. Correction survey in tp. 10-5-2. Traverse in tp. 41-23-Pr.; and tp. 40-24-Pr. Investigation of Big Grass marsh in tps. 15 and 18-10-Pr.
Knight, R. H.	Edmonton, Alta.	Subdivision of tp. 82-6-4. Part subdivision of tp. 84-5-4; tps. 79, 80, 81, 83, and 84-6-4; and tps. 78, 79, 80, 81, 85, and 86-7-4. Traverse in tps. 76, 77, 83, and 84-7-4; tps. 75, 76, and 77-8-4; tps. 73, 74, and 75-9-4; and tps. 73 and 74-10-4.
LeBlanc, P. M. H.	Ottawa, Ont.	Subdivision of tp. 57-29-Pr. Part subdivision of tps. 54 and 55-20-Pr.; tp. 56-21-Pr.; tp. 57-27-Pr.; tp. 57-28-Pr.; and tp. 58-29-Pr. Survey of the east outlines of tp. 53-20-Pr.; tp. 53-21-Pr.; and part of tp. 56-20-Pr. Retracement of part of I.R. No. 31B, and survey of I.R. No. 31F in tp. 54-19-Pr. Traverse of road between Barrier and Sturgeon lakes.
Lighthall, A.	Vancouver, B.C.	Subdivision of tp. 79-1-6; tp. 79-2-6; and tp. 80-7-6. Part subdivision of tps. 77 and 78-1-6; tps. 77 and 78-2-6; tp. 77-3-6; tps. 79 and 80-6-6; and tps. 78 and 79-7-6. Survey of the east outline of tp. 80-5-6.
Lonergan, G. J.	Buckingham, P.Q.	Inspection of contract No. 10 of 1914. Inspection of subdivision parties under Messrs. J. C. Baker, D.L.S.; A. E. Glover, D.L.S.; A. Lighthall, D.L.S. and D. F. McEwen, D.L.S. Inspection of railway belt survey parties under Messrs. N. C. Stewart, D.L.S.; W. J. Johnston, D.L.S.; C. H. Taggart, D.L.S.; J. A. Calder, D.L.S.; and R. B. McKay, D.L.S. Inspection of stadia survey parties under Messrs. G. A. Bennett, D.L.S.; E. P. Bowman, D.L.S.; W. J. Boulton, D.L.S.; G. C. Cowper, D.L.S.; T. A. Davies, D.L.S. C. [illegible]nfret, D.L.S.; and H. M. R. Soars, D.L.S.
Martindale, E. S.	Aylmer, Ont.	Subdivision in tp. 10-3-2. Retracement in tp. 11-6-2; tp. 3-16-2; tp. 11-17-2; tp. 2; tp. 20-29-2; tp. 20-1-3; tp. 11-6-3; tp 7-3; tp. 22-8-3; tps. 15, 17, and 18-9-3; 12 and 13-1-4; and tp. 22-9-4. Correction survey in tps. 15 and 16-2-3; tp. 19-3-3; tp. 16-4-3; tp. 15-5-3; tp. 18-6-3; tp. 16-8-3; tp. 18-11-3; and tp. 16-1-4. Restoration survey in tp. 11-23-2; and tp. 32-1-4. Investigation of monuments in tp. 17-5-3; and tp. 20-9-3. Traverse in tp. 11-2-2; tp. 9-3-2; tp. 21-23-3; tps. 5 and 6-29-3; tp. 19-28-4; and tp. 19-29-4. Survey of reservoir site in tp. 6-21-3. Survey of cemetery at Banff, and correction in St. Julien addition to the townsite of Banff. Preliminary survey of Drumheller townsite in tp. 29-20-4.

SESSIONAL PAPER No. 25

SCHEDULE of Surveyors employed and work executed by them—*Continued.*

Surveyor.	Address.	Description of Work.
McEwen, D. F.	Edmonton, Alta.	Subdivision of tps. 69, 70, and 71-19-5; tps. 69 and 70-20-5; and tp. 69-21-5. Part subdivision of tps. 71 and 72-18-5. Traverse in tp. 72-19-5; and tp. 68-21-5.
McGarry, P. J.	Merritton, Ont.	Subdivision in tp. 58-7-3; tps. 57, 58, 59, and 60-8-3; tps. 57, 59, and 60-9-3; and tps. 59 and 60-10-3.
McKay, P. R.	Vancouver, B.C.	Subdivision in tps. 1, 2, and 5-26-6; tps. 1, 2, 3, and 4-27-6; tp. 4-28-6; tps. 3 and 4-29-6; tp. 3-20-6; tp. 4-5-7; tps. 20, 21, 24, and 42 E. C. M.; and tp. 2 W.C.M. Traverse in tp. 1-26-6; tps. 1, 2, 3, and 4-27-6; tp. 4-28-6; tp. 3-30-6; tp. 4-5-7; and tps. 21, 24, and 42 E. C. M.
McKnight, J. H.	Simcoe, Ont.	Stadia surveys in tp. 42-17-2; tps. 41, 42, 43, 44, and 45-18-2; tps. 39, 40, 41, 42, 43, 44, and 45-19-2; tps. 38, 39, 40, 41, 42, 43, 44, 45, and 46-20-2; tps. 38, 39, 40, 41, 43, 44, 45, and 46-21-2; tps. 44 and 45-21A-2; and tps. 40, 45, 45A, and 46-22-2.
Norraway, A. M.	Ottawa, Ont.	Inspection of base line parties under Messrs. J. R. Akins, D.L.S.; J. A. Fletcher, D.L.S.; and A. G. Stuart, D.L.S.; Inspection of subdivision parties under Messrs. J. A. Buchanan, D.L.S.; W. Christie, D.L.S.; J. H. Johnston, D.L.S.; P. J. McGarry, D.L.S.; J. W. Pierce, D.L.S.; and J. E. Jackson, D.L.S. Inspection of miscellaneous survey parties under Messrs. S. L. Evans, D.L.S., J. M. Coté, D.L.S.; C. F. Aylsworth, D.L.S.; J. A. S. King, D.L.S.; P. M. H. LeBlanc, D.L.S.; and J. S. Galletly, D.L.S.; Inspection of stadia survey parties under Messrs. P. E. Palmer, D.L.S.; W. A. Scott, D.L.S.; and C. M. Walker, D.L.S.
Norrish, W. H.	Ottawa, Ont.	Subdivision of tp. 53-13-2; tp. 53-14-2; and tp. 53-15-2. Part subdivision of tp. 53-12-2; tp. 54-14-2; and tp. 54-15-2. Traverse in tp. 52-12-2; tp. 52-13-2; tp. 52-14-2; tp. 52-15-2; and tp. 54-16-2.
Palmer, P. E.	Ottawa, Ont.	Stadia surveys in tps. 25, 26, 27, 28, 29, 30, and 31-2-3; tps. 25, 26, 27, 28, 29, 30, and 31-3-3; tps. 25, 26, 27, 28, 29, and 30-4-3; tps. 23, 24, 25, 26, 27, 28, 29, 30, 31, and 32-5-3; tps. 23, 24, 25, 26, 27, 28, 29, and 30-6-3; tps. 23, 24, 25, 26, 27, 28, 29, and 30-7-3; tps. 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, and 31-8-3; tps. 20, 21, 22, 23, and 28-9-3; tps. 20, 21, 22, 23, 24, and 25-10-3; tps. 19, 20, 21, 22, 23, 24, and 25-11-3; tps. 18, 19, 20, 21, 22, 23, 24, and 25-12-3; and tps. 19, 20, 21, 22, and 23-13-3.
Parker, J. W.	Pembroke, Ont.	Subdivision of tps. 98, 99, 100, and 101-19-5. Part subdivision of tps. 98 and 99-18-5; and tps. 98, 100, and 101-20-5. Survey of the east outlines of tp. 97-19-5; tp. 97-20-5; and tp. 97-21-5.
Plunkett, T. H.	Meaford, Ont.	Retracement surveys in tps. 4 and 12-9-E.; tp. 1-10-E.; tp. 23-1-Pr.; tp. 22-6-Pr.; tp. 17-20-Pr.; tp. 6-25-Pr.; tp. 39-26-Pr.; tp. 23-27-Pr.; tp. 28-29-Pr.; tp. 23-30-Pr.; tps. 12 and 21-31-Pr.; and tp. 23-32-Pr.; Traverse in tp. 23-1-Pr.; tp. 30-9-Pr.; tp. 17-19-Pr.; tp. 17-20-Pr.; and tp. 28-29-Pr. Subdivision at Bedford Station in tp. 5-9-E.; at Menisino in tp. 1-10-E.; and at Birch River in tp. 39-26-Pr.

SCHEDULE of Surveyors employed and work executed by them—*Continued.*

Surveyor.	Address.	Description of Work.
Purser, R. C.	Ottawa, Ont.	Subdivision in tps. 36 and 37-4-4; and tp. 36-5-4. Resurvey in tp. 24-2-2; tps. 23 and 24-3-2; tp. 19-11-2; and tps. 10 and 49-5-3. Retracement in tp. 32-1-2; tp. 23-3-2; tp. 30-6-2; tp. 30-17-2; tp. 32-26-2; tp. 29-27-2; tp. 50-28-2; and tp. 39-12-3. Correction survey in tp. 29-32-Pr.; tp. 21-6-2; tp. 38-13-2; tp. 28-16-2; tps. 27 and 43-17-2; tp. 46-20-2; tp. 27-24-2; tp. 51-25-2; tp. 38-26-2; tps. 28 and 42-27-2; tp. 38-10-3; tp. 51-15-3; tp. 52-17-3; tp. 42-24-3; tp. 42-25-3; tp. 42-4-4; and tp. 35-19-4. Restoration survey in tps. 27 and 28-26-2. Investigation in tp. 46-3-3. Erection of monuments in tp. 32-1-3. Traverse in tp. 49-27-2; and tp. 29-21-4. Survey of Doukhobor cemeteries in tp. 30-5-2. Lot resurvey in tp. 43-1-3.
Rinfret, C.	St. Stanislas, P.Q.	Stadia surveys in tps. 9, 10, and 17-24-2; tps. 9, 10, 11, 12, 13, 14, 15, and 16-25-2; tps. 10, 11, 12, 13, 14, 15, and 16-26-2; tps. 8, 9, 10, 11, 14, 15, and 16-27-2; tps. 8, 9, 10, 11, 14, 15, and 16-28-2; tps. 8, 9, 10, 11, 12, and 15-29-2; tps. 9, 10, and 11-30-2; tps. 7, 8, 9, 10, 11, and 12-1-3; tps. 7, 8, 9, 10, 11, 12, 13, and 14-2-3; tps. 7, 8, 9, 10, 11, 12, 13, and 14-3-3; tps. 7, 8, 9, 10, 11, 12, 13, and 14-5-3; tps. 7, 8, 9, 10, 11, 12, 13, and 14-6-3; and tps. 7, 8, 9, 10, 11, 12, 13, and 14-7-3.
Scott, W. A.	Galt, Ont.	Stadia surveys in tp. 15-15-E; tps. 17, 18, and 19-14-2; tps. 17, 18, 19, and 2[illegible]; tps. 17, 18, 19, 20, 21, 22, 23, 24, 25, 2[illegible]A, and 28-16-2; tps. 16, 17, 18, 19, 20, 21, [illegible], 23, 24, 25, 26, 27, 28, and 29-17-2; tps. 17, 18, 19, 21, 22, 23, 24, 25, 26, 27, and 28-18-2; tps. 17, 18, 19, 20, 21, 22, 24, 27, 28, and 29-19-2; tps. 17, 18, 19, 21, 22, 23, 24, 25, 26, 27, and 28-20-2; tps. 17, 18, 19, 20, 22, 23, 24, 26, 27, 28, and 29-21-2; tps. 17, 19, 22, 23, 26, 27, 28, and 29-22-2; tps. 22, 26, 27, and 28-23-2; tp. 27-24-2; and tp. 28-25-2.
Seibert, F. V.	Edmonton, Alta.	Subdivision of tp. 65-6-4; tp. 65-7-4; tps. 65 and 66-8-4; and tps. 65 and 66-9-4. Part subdivision of tp. 66-6-4; and tp. 66-7-4. Survey of the east outlines of tps. 67 and 68-8-4. Traverse in tp. 64-9-4.
Soars, H. M. R.	Edmonton, Alta.	Stadia surveys in tps. 46, 47, 48, and 49-15-4; tps. 46, 47, 48, and 49-16-4; tps. 44, 45, 46, 47, 48, and 49-17-4; tps. 44, 45, 46, 47, 48, and 49-18-4; tps. 45, 46, 47, 48, and 49-19-4; tps. 45, 46, 47, 48, and 49-20-4; tps. 45, 46, 47, and 48-21-4; tps. 44, 45, 46, 47, and 48-22-4; tps. 44, 45, 46, and 47-23-4; and tp. 46-24-4.
Stewart, N. C.	Vancouver, B.C.	Subdivision in tp. 29-23-5; tps. 28 and 29-29-5; tps. 23, 24, and 28-1-6; and tps. 23 and 24-2-6. Traverse in tp. 29-23-5; tp. 24-1-6; and tps. 24, 25, 26, and 27-2-6. Townsite correction survey at Golden.
Stuart, A. G.	Winnipeg, Man.	Retracement survey of the Third meridian from the international boundary to township 48; and the 14th base line from the east boundary of range 22 west of the Third meridian, to the Fifth meridian. Miscellaneous retracement in tp. 12-28-2; tp. 11-30-2; and tp. 12-1-3.
Taggart, C. H.	Kamloops, B.C.	Subdivision in tp. 21-11-6; tps. 21 and 22-12-6; tps. 23 and 24-14-6; tps. 21, 22, 23, and 24-15-6; tps. 20 and 21-16-6; and tp. 17-17-6. Traverse in tp. 22-12-6; tp. 20-16-6; and tp. 17-17-6.

SESSIONAL PAPER No. 25

SCHEDULE of Surveyors employed and work executed by them—*Concluded.*

Surveyor.	Address.	Description of Work.
Walker, C. M.	Ottawa, Ont.	Stadia surveys in tps. 36 and 37-22-2; tps. 34, 35, 36, and 37-23-2; tps. 33, 34, 35, 36, and 38-24-2; tps. 33, 34, 35, 36, and 38-25-2; tps. 33, 34, 35, 36, 37, 38, and 40-26-2; tps. 34, 35, 36, 39, 40, 41, 42, and 43-27-2; tps. 34, 35, 36, 37, 38, 39, and 40-28-2; tps. 34, 35, 36, and 37-29-2; and tps. 35, 37, 40, and 47-1-3.
Wallace, J. N.	Calgary, Alta.	Lines of levels along Hudson Bay railway from Mile 100 to Mile 241; along Canadian Northern railway from Rosebud to Calgary; along Edmonton Dunvegan and British Columbia railway from Edmonton to Sawridge; along Alberta and Great Waterways railway from Carbondale junction to 18th base line; a line from Dunvegan to Grande Prairie and northwesterly through Pouce Coupé to 21st base line; a line from Big River northerly to Ile à la Crosse, and a line along 19th base across ranges 5 to 9 west of the Sixth meridian.

Appendix No. 2.

SCHEDULE showing for each surveyor employed the number of miles surveyed of section lines, township outlines, traverses of lakes and rivers, and resurvey; also the cost of the same. Surveyors whose work cannot be reckoned in miles are omitted from the statement.

	Miles of section.	Miles of outline.	Miles of traverse.	Miles of re-survey.	Total mileage.	Total cost. *	Cost per mile.
						$	$ cts.
Akins, J. R.		216			216	25,293	117 10
**Aylsworth, C. F.			37	79	116	5,134	44 26
Baker, J. C.	307	86	111		504	18,396	36 50
Bennett, G. A.			810	8	818	6,148	7 51
Blanchet, G. A.		157			157	21,783	138 74
Boulton, W. J.			897	38	935	6,496	6 94
Bowman, E. P.			841	47	888	5,965	6 72
Brenot, L.	300	60	68		428	19,265	45 01
Buchanan, J. A.	364	108	127		599	17,413	29 07
Calder, J. A.	96		3	14	113	9,749	86 27
Christie, W.	278	91	84	12	465	15,793	33 96
Cote, J. M.				473	473	15,645	33 08
Cowper, G. C.			427	16	443	5,843	13 19
Davies, T. A.			678	10	688	5,582	8 11
Deans, W. J.	91	43	159		293	9,549	32 59
Evans, S. L.			39	523	562	16,451	29 27
Fawcett, S. D.	345	90	61	1	497	18,875	37 98
Fletcher, J. A.		195			195	21,430	109 90
Galletly, J. S.	52	19	131		202	10,152	50 56
Glover, A. E.	325	121	1		447	17,908	06
Jackson, J. E.	188	41	207		436	12,902	29 59
Johnston, J. H.	378	132	28		538	18,413	34 22
Johnston, W. J.	82		27	15	124	9,976	45
***King, J. A. S.	73		34	294	401	9,866	24 60
Knight, R. H.	338	63	131		532	18,224	34 26
LeBlanc, P. M. H.	129	76	138		343	11,667	34 01
Lighthall, A.	455	81	21		557	17,838	32 02
McEwen, D. F.	392	64	48		504	17,745	35 21
McGarry, P. J.	256	45	157		458	17,827	38 92
McKay, R. B.	64		62	21	147	12,028	81 82
McKnight, R. H.			818	7	825	5,667	6 87
Norrish, W. H.	265	56	115		436	18,229	41 81
Palmer, P. E.			596	94	690	6,011	8 71
Pierce, J. W.	331	126	151		608	15,690	25 81
Rinfret, C.			515	59	574	6,293	10 96
Scott, W. A.			649	20	669	5,716	8 54
Seibert, F. V.	434	82	146	24	686	18,271	26 63
Soars, H. M. R.			751	6	757	5,736	7 58
Stewart, N. C.	69		8	46	123	10,470	85 12
Stuart, A. G.				513	513	8,443	16 ·
Taggart, C. H.	133		12	13	158	9,430	59 (
Walker, C. M.			618	22	640	5,712	8 93
	5,745	1,952	9,706	2,355	19,758	535,024	27 08

*Total cost includes depreciation of outfit.
**Ceased work in July owing to illness.
***Took charge of Mr. Aylsworth's party.

Appendix No. 3.

DETAILS OF OFFICE WORK.

Letters and memoranda	7,540
Sketches, maps, and tracings	1,937
Descriptions of irregular parcels of land	23
Returns of survey examined:—	
Township subdivision	199
Township outline	155
Stadia plots	1,454
Townships investigated for water areas	639
Road and railway plans	651
Yukon lots and miscellaneous surveys	16
Mineral claims	21
Timber berths	4
Correction and other miscellaneous surveys	156
Preliminary township plans	278
Township and miscellaneous plans compiled	795
" " " issued	1,162
Sectional maps issued (3 miles to 1 inch)—	
New maps	4
Revised maps	20
Photographic work—	
Dry plates and films	649
Prints	6,058
Lantern slides	14
Wet plate negatives	2,187
Photo litho plates	560
Lithographic work—	
Number of maps	306
Copies of maps	124,767
Number of townships	1,095
Copies of townships	174,950
Number of forms	67
Copies of forms	66,073

PART V

DOMINION PARKS

REPORT OF THE COMMISSIONER OF DOMINION PARKS.

The reports of the field officers of the Dominion Parks Service appended hereto recite the particulars of the progress made during the fiscal year ending March 31, 1917. All that it is necessary for me to say in that connection is that despite war conditions, resulting necessarily in a reduction of financial appropriations and a shrinkage of tourist traffic, the year has been one of results exceeding expectations.

As the end of the third year of war approaches and the results of war from the economic and from the human viewpoint become more and more apparent, it seems desirable to take stock of the potentialities of our national park system, to see what place national parks play in the national life and how they can be utilized to the greatest possible advantage in connection with conditions arising out of the war.

The two most important conditions arising out of the war are the gigantic expenditure in the form of money, and the equally gigantic expenditure in the form of human life, vitality and efficiency, in other words man-power.

Both in connection with the development of financial capital and in connection with the development and conservation of national man-power, national parks possess huge and distinct potentialities.

In previous reports attention has been called to the large sums of money spent annually by tourists and to the attractions that Canada's incomparable scenic areas offer to tourist traffic. Canada's mountain wonders, her hunting, her fishing, her recreational areas generally, constitute a national resource, the possibilities of which, from the commercial standpoint in connection with tourist traffic, are almost incalculable. The national parks include many of the most unique and outstanding natural attractions of the Dominion. They are the focal points which stand out in the tourist world.

EXCEPTIONAL OPPORTUNITIES.

In times when the national income must be increased by every possible means, tourist traffic appears to offer exceptional opportunities for results with a minimum of expenditure. In this connection it is interesting to note that tourist traffic is more and more being given its proper place as a great potential source of wealth and one worthy of the attention of modern governments. The war made France, Switzerland and Italy realize fully for the first time the amount of money which had been brought into their respective countries by foreign visitors. Recent estimates show that prior to the outbreak of hostilities some 300,000 Russians were in the habit of rusticating in Germany and Austria where they left each year something over $200,000,000. There were 113 seaside resorts along the Baltic and the North sea in 1913, and in that year they entertained 800,000 visitors who left behind nearly $100,000,000. The annual expenditure of Americans in France was conservatively placed at from $200,000,000 to $250,000,000. The Rhine, the show river of Europe, brought in $100,000,000; the cities of Berlin, Düsseldorf, Dresden and Münich collected many millions more. Berlin alone, it is estimated, realized $50,000,000 and the revenue of Vienna was probably greater. .The closing of the frontiers put an end to this exchange of money and financiers suddenly realized what an important source of revenue had been lost. France, particularly, it is said, has awakened to the importance of tourist traffic. It is recognized that the $600,000,000 formerly paid by foreign tourists for the right of

trespassing on French soil would constitute a yearly indemnity which would go far towards meeting the enormous liabilities now being incurred. Prominent financiers began some time ago to recommend that even before the cessation of hostilities steps should be taken and an organized effort made to secure a large share of tourist traffic after the war and to provide for its accommodation. In her battlefields France realizes she has a wonderful tourist attraction that will draw people from all parts of the globe. It is said that 120,000 passages have already been booked for Europe by the first available boats to leave after the war. A recent newspaper article reports that the French Government considers the matter of such importance that it has established a new cabinet portfolio known as the National Office of Touring which is working in connection with railway and steamship companies, hotel syndicates and tourist agencies and is rapidly making arrangements to handle the immense traffic expected. Plans are already being made, it is said, to lodge, feed and convey tourists in the devastated districts; hotels are being planned, an automobile service arranged and a central information bureau is to be established in Paris.

National Tourist Bureau.

The establishment of a national bureau for tourist travel is an example, as I have pointed out before, which might well be followed in Canada. While this country cannot compete with the attractions of Europe on their own ground, it has yet special qualities of its own which even they cannot rival. The immense sums now being added to our national indebtedness make it doubly desirable that this potential source of revenue should be devoloped to the full. Figures compiled by the Canadian Pacific Railway Company's officials show that 10 per cent of the money formerly spent by tourists in Europe would amount to $500,000,000, a sum equal to the value of the Canadian wheat crop in 1916. If this amount could be diverted to Canada each year, think what it would add to our national prosperity. In the lists of the season's visitors kept by the various hotels at Banff over forty-five different nationalities are represented, which shows how wide is the field from which the present traffic is drawn and indicates the possibilities which would follow a comprehensive plan of publicity.

The Secretary of the Interior at Washington estimates that in 1915, over $100,000,000 of the money which formerly went to Europe was diverted to the United States National parks. Their total number of visitors was about 278,000. The number of visitors to the Canadian parks during the same year was 121,533 or about 43 per cent of that which went to the United States parks. On the same basis of expenditure the travel to the Canadian parks would have been worth somewhere in the neighbourhood of $43,000,000. While the amount of money spent in the Canadian parks or brought into Canada through the parks has never yet been closely estimated it is evident that it reaches each year a very large sum,—that it constitutes a harvest which warrants considerable effort and expenditure to reap. There is probably no field of enterprise in which a small investment brings such a large return. Denver, Col., recently spent $75,000 in advertising its attractions and expects, it is said, to get $50,000,000 in return, largely through motor travel.

THE AUTOMOBILE.

Within the past few years a new factor has developed which promises to have a very important relation to the question of tourist traffic and that is the automobile. The increasing use of the motor is one of the most striking developments of the last decade. There are reported to be at the present time over 4,000,000 cars in use in the United States. The output for 1916 was approximately 1,500,000 cars or almost double the production of the previous year. The 1917 output is placed at from

2,000,000 to 2,500,000 cars. The Canadian production shows a similar increase. In 1915 the different Canadian plants turned out approximately 82,000 cars; in 1916, 110,000, worth approximately $50,000,000. There are said to be over 75,000 cars in the three prairie provinces alone.

These figures indicate that automobile traffic must be taken into account more and more for the future. Thousands of people now spend their vacations in their cars and they are seeking out every scenic district accessible by good roads. The national parks of both the United States and Canada have had to throw open their gates to this form of traffic. For many years the United States parks were closed to automobiles but as a result of very strong representations from motorists they were all finally thrown open a year or so ago and the resulting increase in travel has been surprising. In 1915 there were 12,563 cars registered at the different parks, in 1916, nearly 20,000 carrying about 80,000 passengers. Mr. Stephen T. Mather, formerly assistant to the Secretary of the Interior now Director of National Parks, says in his recent report:—

> "The number of tourists entering the parks in private cars is astonishing when one takes into consideration the fact that they have been open to motor traffic only a very few years and that one of the larger parks has only been open a season and a half. This tremendous increase in automobile travel leads to one conclusion only and that is that in the early future, travel in private machines will overtake the increasing railroad travel and constitute the greater part of all park travel. This makes it incumbent upon the Federal Government to prepare for the great influx of automobiles by constructing new roads and improving existing highways wherever improvement is necessary."

The Canadian parks have had something of the same experience. For many years Rocky Mountains park was closed to motor vehicles of all kinds. With the building of the first section of the Calgary-Vancouver motor road, restrictions were removed so as to allow automobiles to proceed from Calgary to Banff. A little more than a year ago all roads in the park suitable for motor traffic were thrown open. The result has been that the number of people coming into the park by motor has more than doubled in the past year.

CANADA'S OPPORTUNITY.

Canada is in a peculiarly favourable position to-day to attract and secure tourist traffic. In the first place she possesses in abundance that which the tourist wants. For the sportsman there is big game from one end of the Dominion to the other; for the fisherman, fishing unequalled in quantity and variety; for the traveller who desires to see nature in its most beautiful and unique forms, attractions unequalled elsewhere.

Owing to the war having stopped the huge volume of travel from the United State to Europe, Canada now has exceptional opportunities for marketing her recreational resources. Though the American, the most constant traveller in the world, cannot go to Europe, he at the same time, through the prosperity the war has brought him, is probably better able to travel than ever before. He must do his travelling practically in his own country or in Canada. And the potential volume of traffic is ample to tax the existing accommodation of both countries.

To summarize, Canada has what the tourist wants. Canada needs as never before, the volume of gold that accompanies tourist traffic. Conditions for securing tourist traffic appear to be exceptionally favourable. It, therefore, seems that by actively taking up the question, Canada can make her recreational resources, both within and without national parks, contribute substantially to the financial needs the war has thrust upon her.

THE HUMAN SIDE.

Quite apart from tourist traffic and its commercial possibilities, there is another feature of national parks, which has a distinct bearing upon the commercial problem

arising out of the war. It relates to the question of Canada's losses in man power, through the death of thousands of its most virile men in France; to the thousands more who are returning maimed and seriously incapacitated; and in addition to the serious results of the war in the way of impaired nerves and health in regard to those at home. All these conditions directly and seriously affect the efficiency of Canada's man-power. The financial and commercial problems arising out of the war have to be solved by Canada's man-power and the efficiency of her man-power is therefore a matter of the utmost national concern. The only way Canada can meet her financial responsibilities is by increasing her production of wealth. Her natural resources, rich as they may be, can be transformed into money only by the exertions of her man-power. Output is now the most important consideration for Canada and the output depends entirely on man-power. It is felt that national parks and especially what national parks stand for, can contribute materially to the development and efficiency of the Dominion's man-power.

The fundamental purpose behind the establishment and maintenance of national parks is the development and maintenance of rugged, forceful, intelligent manhood. The most common and the most successful treatment a physician prescribes for a patient is an order to go to the mountains or the seaside or the country. And the logic underlying this prescription is the same logic which brought about the creation of national parks. The curative results which follow such an outing are recognized to be due to the recreation in the out-of-doors involved in the trip.

By instinct all people have the desire for and recognize the necessity of recreation. By observation and experience physicians and students recognize that recreation is nature's means for restoring health and the mental and physical alertness and efficiency that go with it. In addition man is by nature an out-of-doors animal and the oftener he can get away from the stone and mortar that civilization has built around him and from the monotony and nerve-wrecking conditions that industry has harnessed him to—the oftener he can get away from these things and get close to nature, the better he becomes physically and mentally and spiritually. A wild strawberry plant can be transplanted into a garden, it will grow, but what of its fruit? In a few years it will lose that peculiar tang which was its soul. Transplant it back to the wilderness and it will regain that tang, will regain its soul. And so it is with man. Separation from nature robs man of much that makes him man. It is true that conditions of modern life make it impossible that he should spend all his life close to nature. Therefore, the next best thing is that he should have opportunities from time to time of getting close to nature of the wilderness and there restoring his stock of vitality and efficiency. National parks have been set aside to ensure the people for all time of areas where they can have access to nature of the wilderness. While for geographical reasons all the people of Canada cannot visit the national parks, there are still vast areas throughout the Dominion as yet untouched by private ownership, where nature of the wilderness awaits the people. As things are now, no one need go far away from home to reach nature. And one of the greatest necessities of the times is that Canada's people should now start making recreation in the great out-of-doors a habit. The occasional visit will be beneficial but it is not enough. It is the habit that must be developed.

A LESSON FROM BRITAIN.

In this connection it is interesting to note the experience of Great Britain in regard to the munitions industry. With the outbreak of the war Britain found her industries deprived of thousands of her trained men and yet facing the necessity of an output of munitions undreamed of before. But what she did is well known. How she did it is less well known. At the outset the idea was to make everyone work long hours and Sundays with scarcely any time for rest or recreation. But experience

gradually showed that this policy was not bringing the results expected. The maximum results as to sustained output were attained only after it was recognized that output depended upon the health and vitality of the workers and that excessive hours and strain without rest or recreation seriously affected the workers and as a consequence the output.

In 1915 the Imperial Government appointed a committee "to consider and advise on questions of industrial fatigue, hours of labour and other matters affecting the personal health and physical efficiency of workers in munition factories and workshops." This committee made an exhaustive investigation and published the results in a series of reports. The reports covered many recommendations in regard to Sunday work, overtime, and many other matters, all calculated to maintain output at the highest possible point. They pointed out that fatigue and staleness resulted not only in diminished output but in an inferior quality of work; and insisted that in her industrial life Britain must be guided by physiological science and by a proper recognition of the value of rest and recreation.

Canada is in much the same position as Britain was when the war began. She must speed up and maintain at a high standard an output—not of munitions but of natural wealth. And this cannot be done unless recreation is given the attention natural law demands it should be given.

THE PROTECTION OF WILD LIFE.

The system adopted with regard to the protection of wild life in the parks continues to show gratifying results. Wild animals and birds are increasing in all the parks and losing practically all fear of man. In Rocky Mountains park deer are especially numerous and so tame that they come into the townsites and may be seen in groups on the streets or nosing around back doors looking for tidbits in the shape of food. Mountain sheep and goats, which were formerly met with only in the remote districts and seldom more than five or six together, are now seen in all parts of the park even on the motor road a mile or two from Banff itself and frequently in flocks numbering 50, 75 or 100. In Jasper and Waterton Lakes parks, bear, moose, elk, beaver, grouse, ptarmigan, wild ducks and geese are also increasing noticeably. Apparently the wild life of the Rockies has found out for itself that park boundaries constitute a sanctuary. This was especially evident last autumn in Jasper park when great numbers of wild ducks and geese flew into the park at the opening of the hunting season realizing that within its borders they were safe. In Waterton Lakes park, in the new area recently added, the warden reports that twice as many elk and deer were seen as at any time in the past ten years, and during migration the lakes were covered with wild fowl which remained for a week or two before completing their journey.

RECREATIONAL VALUE OF WILD LIFE.

Viewed simply from the recreational point of view there is no doubt that the wild life constitutes one of the most important features of the parks. It is of no less consequence than the scenery itself, in fact it may almost be said to be a part of the scenery. Travellers familiar with Switzerland were wont to refer to the loneliness of the Rockies but the sight of half a hundred beautiful bighorn sheep crossing a green upland or a herd of white goat high up on the mountain slope—both of which may be seen by even a casual visitor to the Canadian parks—provides something of the same interest which human habitation supplies in the Alps and gives many people even greater pleasure. For to most people the greatest charm of the Canadian parks is that they provide the opportunity of getting back, in a greater or less degree, to nature, and the nearer it is to primitive nature the more pleasure they feel. This is based on what is now recognized to be one of the fundamental laws of recreation—that the best recreation is that which brings into play the side of our nature which is not exercised

by our ordinary life. To go out into the quiet of woods or mountains produces a feeling of perfect rest and liberation—a true re-creation. In such surroundings many long dormant faculties are brought into play. Almost every sensation travels along old grooves worn in the minds of long past generations. A person finds pleasure in the absolute stillness, in primitive and natural sounds such as the wind in the trees, the falling of water, the wide expanse of landscape or sky, and he renews again his ancient relationship with wild animals, a relationship as old as man himself.

WILD PLACES DISAPPEARING.

National parks, it is true, have no monopoly of this form of recreation. In this country there still remain unspoiled, virginal places where nature is practically undisturbed but they are growing fewer each year. Henry Fairfield Osborne, President of the New York Zoological Society, says that travels in Europe as well as over a large part of North America have convinced him that nowhere is nature being destroyed so rapidly as on this continent. "Except within our conservation areas," he says, "an earthly paradise is being turned into an earthly hades and it is not savages who are doing this but men and women who boast of their civilization."

Part of this destruction is of course inevitable. As settlement progresses plant and animal life are bound to disappear. At our present rate of development, even in Canada, the time is not far distant when it will be only in the national parks that the ordinary traveller will be able to find a perfect picture of primitive conditions as they were before the advent of man.

In the Canadian parks it is the aim to protect and preserve the original balance of nature. No attempt is made at underbrushing or clearing except where necessary in the vicinity of townsites or for fire protection purposes and the required roads and trails are built with as little disturbance as possible. The wild life therefore, both animals and birds, find their natural food supply undisturbed and free from all fear of man, they live and breed under the most favourable conditions. It seems probable that they will increase in sufficient numbers to re-stock eventually the whole Rocky mountain area from which they were fast disappearing.

For the student and nature lover, the parks are bound to become more and more the great outdoor school for the study of natural history. They contain more big game species than any other area in the country, and nowhere can their life and habits be studied with such convenience, and a flora which for beauty and variety is almost without an equal in the world.

WILD LIFE BOARD.

During the year an important step was taken with regard to game protection matters which come under Federal control throughout the Dominion. This was the appointment of an Interdepartmental Advisory Wild Life Board. The board consists of the following members:—Chairman, James White, Assistant to the Chairman and Deputy Head of the Commission of Conservation; Secretary, Dr. C. Gordon Hewitt, Dominion Entomologist and Consulting Zoologist; D. C. Scott, Deputy Superintendent General of Indian Affairs; Dr. R. M. Anderson, of the Geological Survey; and the Commissioner of Dominion Parks. The board will act in an advisory capacity in all matters concerning the preservation of wild life.

The creation of a special central authority will, it is thought, be a great assistance in the protection of wild life throughout the Dominion. While game matters in the provinces come under their respective governments, there are many questions in which the best results can be secured if the Federal and Provincial authorities act together and the board hopes to be able to secure the co-operation of the different provinces in these matters and also to place at their disposal any special information which it is able to secure through the technical officers attached to the various federal branches.

SESSIONAL PAPER No. 25

MIGRATORY BIRD TREATY.

One of the first matters to come before the board was the framing of an act to enforce the provisions of the Migratory Bird Treaty entered into between Canada and the United States. This treaty was formally signed at Washington by Sir Cecil Spring Rice and Mr. Robert Lansing in August, 1916, and ratified by the United States Government in December last. All that now remains to be done is the passing of a bill by the Canadian Parliament sanctioning its provisions and providing for their enforcement. A great deal of the work in connection with this treaty, as well as in the general matter of bird protection throughout Canada, has been done by Dr. Gordon Hewitt, Dominion Entomologist, and it was largely owing to his efforts that the treaty was finally brought to a successful conclusion in so far as Canada is concerned, but in view of the fact that the parks branch is administering other wild-life matters, the carrying out of measures necessary for the enforcement of the treaty has been placed in its hands.

The intention of the convention is to provide much-needed protection for game and insectivorous birds which migrate from one country to the other. It is a matter of common knowledge that for many years past the number of migratory birds has been noticeably decreasing. This has been partly due to unavoidable causes. In this country as settlement has progressed, their breeding places have been gradually encroached upon; the clearing of the land has involved the destruction of the nesting sites of insectivorous birds, the draining of the marshes and the breaking up of the prairies have driven wild fowl from their former breeding and feeding places. Other causes have been the increased use of modern firearms and the ease with which automobiles and power boats enable hunters to cover very large areas in search of good shooting. In the United States, market shooting, spring shooting and the demand for birds for millinery purposes have also caused immense inroads.

Since a great number of both game and insectivorous birds breed in Canada but return to the Southern United States for the winter season, the only way of affording them adequate protection is the introduction of similar legislation throughout both countries protecting them all along the line of migration. Arrangements are being made to have the various state laws amended to agree with the spirit of the convention and negotiations have also been entered upon with the different provinces in Canada with a similar end in view.

It is admitted that immediate action to preserve our insectivorous bird life is absolutely necessary. A recent estimate places the annual damage from injurious insects in Canada to field crops alone at $125,000,000. This is an enormous sum and it does not take into account the damage done to orchards and forests. Birds are the greatest enemies of insects and in a state of nature they exist in sufficient numbers to keep the latter in check. Especially at this time when the need for conserving our food supply in every possible way is so clearly apparent, it would seem that immediate action should be taken and a determined effort made to restore the balance of nature and to remove this heavy tax upon our agricultural industry.

WILD LIFE OF THE FAR NORTH.

Another question of first importance to come before the board was the necessity of affording greater protection to the wild life of the far north. Until recently it was considered the remoteness of this area afforded sufficient protection, but in recent years, an alarming decrease in many forms of wild life has taken place. The musk-ox in particular, is perilously near extermination and will disappear unless afforded further protection. Formerly there were herds of musk-ox as far south as Slave lake, but recent Hudson Bay Company reports show that throughout the entire Mackenzie district they have almost disappeared.

BARREN-LAND CARIBOU.

The barren-land caribou is also in need of additional protection. Although very large herds are yet to be found east of the Mackenzie, to the west along the northern coast from the mouth of the river to Point Barrow in Alaska, they have almost disappeared. In the absence of the caribou the natives have had to move away in search of food, and house ruins all along the coast bear melancholy witness to their departure.

As I have pointed out on previous occasions the barren-land caribou offer a possible source of future meat supply. Their flesh is as palatable and nutritious as venison and their numbers are still estimated in the millions. Under proper protection and with an adequate system of transportation, there seems no reason why they could not be utilized for food in the not distant future. Reindeer are now being shipped from Alaska to the Seattle markets, where they bring from 20 to 35 cents per pound. The Governor of Alaska, in his report for 1916 to the Secretary of the Interior, says that under proper management Alaska may in due time become a source of large meat supply for the United States. The barren-land caribou would furnish an equally valuable source of food for this country and it would seem to be economic folly of the worst kind to permit a food resource of this value to be wantonly and wastefully exterminated. The Wild Life Board has drafted amendments to the existing Northwest Game Act looking towards a more adequate system of protection for barren-land caribou and also for the Arctic white fox and other fur bearing animals in need of protection which will come before Parliament during the present session.

ELK FROM YELLOWSTONE NATIONAL PARK.

During the year a fine herd of 63 elk was procured through the courtesy of the United States authorities from the Yellowstone National park. The intention is to retain these animals in captivity until they become used to their new conditions and then to liberate them in the Rocky Mountains park in a district where, by closing certain draws in the mountains, they will be completely isolated and soon revert to an absolutely wild state.

WILD ANTELOPE RESERVE.

I referred last year to the gratification which was felt at the capture of a herd of nearly 50 wild antelope which were secured by building a fence around the area in which they were discovered feeding near Nemiskam, Alta. So far the experiment appears to be entirely successful. The antelope are thriving and show an increase of over twenty for the year, making a total of seventy now in the reserve. This seems to bear out the belief that the failure of previous experiments was largely due to the shock of capture which these little animals are apparently too delicate to withstand.

ANALYSIS OF HOT SULPHUR WATER, BANFF.

Through the courtesy of the Department of Mines an examination of the hot sulphur waters at Banff, with special regard to their radio-active properties, was made during the winter by Mr. R. T. Elworthy. The results of the analysis showed that the Banff springs contain larger quantities of radium emanation, both in the waters and gases given off, than any others yet investigated in Canada. The radio-activity of the gases evolved from the Banff waters is considerably higher than that of the Mammoth hot springs in Yellowstone park, while the average value of the radio-activity of the waters is very similar. The Banff springs also contain a small amount of radium element, in solution, which renders them permanently active.

The investigations also showed that in temperature and constituents the Banff waters very closely resemble the Kings Well springs at Bath, England, long famous for their therapeutic qualities. Both have calcium salts as the chief substance present

and while the Bath waters contain slightly more iron and sodium, the Banff springs show a somewhat higher percentage of calcium and magnesium. The gases evolved from both are almost identical, showing in practically equal amount, the presence of argon and helium, the rare gases of the atmosphere.

MOUNT EDITH CAVELL.

During the year one of the most striking mountains in Jasper park was set aside as a memorial for Miss Edith Cavell, the English nurse who was executed by the Germans. This mountain, which was formerly known locally as Geikie, although the true Geikie lies to the northwest near the Divide, is of outstanding beauty. It is over 11,000 feet in height, shaped like a great pyramid or as some one has said "like a gigantic, upturned human heart." Its summit is crowned with eternal snows of a dazzling purity. A wonderful tongue glacier, with two extended arms, hangs on the side, and its lower slopes are clothed in a "rose red robe" of heather and millions of bright-hued flowers. The mountain is clearly visible from Jasper and for about 15 miles along the railway to the west and will become, I believe, one of the chief features of interest in the park.

Its solemn grandeur, the majesty of its pure and lonely beauty make it a memorial probably without parallel in the world. They suggest the exaltation of those feelings which rise above the rivalries and hatreds of nations and which all nations must admire. It forms an undying tribute to a sacrifice in the service of humanity. It has been suggested that Swinburne's noble lines should be carved on one of its rocky faces:

"Unto each man his handiwork, unto each his crown,
The just Fate gives;
Whoso takes the world's life on him and his own lays down,
He, dying so, lives."

J. B. HARKIN.

APPENDIX No. 1.

REPORT OF THE CHIEF SUPERINTENDENT OF DOMINION PARKS.

While the great necessity of economy, owing to the war, has been brought home to the people of this continent, particularly in Canada, the amount of travel by tourists in all the parks during the past year was most gratifying. One feature, standing out most prominently, being the unusually long sojourns made by the visiting tourists.

ROCKY MOUNTAINS PARK.

During this year a greater part of the work in the park has been carried out by the alien prisoners, for whom two camps have been maintained. During the summer months they were installed at Castle, and for the winter, quarters were again prepared for them at the Cave and Basin. They have been employed chiefly on road work, clearing dead timber in the Buffalo park and other places and making fire guards and other work.

The motor road, which in the future, will undoubtedly be one of the outstanding features of the park, has been completed to a point west of Castle, though the surfacing with gravel was left for completion this year.

YOHO PARK.

In this park only absolutely necessary work has been carried on, such as the maintenance of roads and trails. The continual wet weather at the beginning of the season delayed operations on repair work necessary to put the trails and roads into condition for tourist traffic.

Two new bridges were built during the year, one over the Kicking Horse river and the new road leading to it and the other over Boulder creek. Both of these bridges were built by alien labour but are not fully completed as yet.

One very necessary piece of work was the completion of the telephone line from the superintendent's office at Field to the fire warden's cabin at Takakkaw falls, a distance of about 11·5 miles. This line will be of the greatest assistance in the prevention and handling of forest fires, for in this particular section of the park a fire travels very rapidly and unless handled by a sufficiently strong guard, at the commencement, would be extremely hard to control.

GLACIER PARK.

The chief attraction in this park is the Nakimu caves. A new entrance to the lower caves has been constructed by driving a tunnel through the solid rock, and a trail now connects this entrance with the old path, thus making the caves more accessible.

The construction of the Connaught tunnel by the Canadian Pacific railway, through mount Macdonald in the Selkirks, has been completed with the exception of a few minor details and the old line has been abandoned. The new Glacier station, which is very attractively built of peeled logs, is about a mile and a half from the former one of that name. A carriage road has been built to enable visitors who wish to visit the glacier, caves and other attractions of the park, to reach Glacier chalet.

REVELSTOKE PARK.

Revelstoke park, recently set aside, will open up a very large field of recreation to the tourist. The motor road now under construction will bring it within easy reach of the town of Revelstoke.

Owing to the absence of Mr. Maunder, who enlisted for overseas service, the work of superintending this park was placed in the charge of Mr. E. N. Russell, Superintendent of Yoho and Glacier parks.

The continuation of construction work on the auto road to the summit of mount Revelstoke was all that was undertaken this year. Work was begun in June and continued until August, the road being completed to the ravine, which is to be crossed by a wooden trestle bridge.

BUFFALO PARK.

At the beginning of 1916, the charge of this park was handed over to the new superintendent, Mr. A. G. Smith, of Edmonton.

Following the policy adopted last year the chief work of the park has been the carrying on of the farming operations. These have increased considerably the last two years, oats having been grown so extensively that it was possible to send supplies to the other parks as well as to the Forestry and other branches of the department. Altogether 435 acres were put into crop, the produce of 400 of which was threshed and in all 19,530 bushels of oats have been shipped from Buffalo park to various points.

Considerable quantities of excellent hay are also grown in this park; from one spot alone 225 tons were cut and put up for the use of the animals, in fact haying operations in different parts have been carried on during the whole of the season and in this manner ample feed for the buffalo has been obtained for the whole of the year.

Work on the fences of the park is more or less continuous, as repairing and replacing posts is going on most of the year. About 1½ miles of the main fence on the northwest corner of the park were moved to permit the construction of a road for the convenience of the farmers living on the west side of the park and to allow the Rubinox gate to be closed permanently. A new 7-foot fence has been erected around the horse pasture and is a great improvement.

The fireguards have been ploughed both within and without the fence as usual.

The land along the shore of Mott lake was surveyed with a view to utilizing this area as a summer resort. About sixty-five choice lots were laid out and will shortly be open to the public for application. This lake provides excellent boating and bathing, and its proximity to the great buffalo herd should prove an added attraction for summer visitors.

The buffalo herd at the end of January consisted of 2,402 head, of which 476 are bulls, 480 cows and 1,446 young stock. With the exception of a few old crippled animals which are gradually being weeded out, all are in splendid condition. The question of subdividing the herd and the building of a large corral and dipping vat should be seriously considered. In June, 1916, a buffalo calf was sold to the "Shriners" and it was taken with them on their trip to Buffalo, N.Y., and presented to that city where it created a great deal of interest. In August a young bull was shipped to Vancouver, B.C., to be loaned to the Stanley park authorities.

The elk, moose, and mule deer are all in a healthy condition and have increased during the year.

A portion of the park will be fenced off for the cattalo experiment which is being carried on under the direction of Mr. J. H. Grisdale, Director of Dominion Experimental Farms. The cattalo have been shipped from Scott, Saskatchewan, and it is hoped a valuable type of animal will result. They are now held within the townsite enclosure.

ELK ISLAND PARK.

The work in this park, during the year, consisted chiefly of repairing fences. Owing to the general curtailment of expenses, no improvements were begun or carried out. Most of the fences around the park have been repaired and the fireguard reploughed.

In July haying operations were begun, but owing to the wet weather only a moderate amount of hay could be put up. It has been necessary to purchase straw and hay to help with the winter feeding of the animals as the great depth of snow, long winter and late spring prevented the bison and other animals ranging for themselves.

All the animals, buffalo, moose, elk and deer, are increasing and I strongly advise that the boundaries of this park be extended as the area is becoming too limited. It would be an excellent plan to take in a portion of the Cooking Lake Forest reserve and so give them a larger space on which to roam and feed.

A part of the lake shore, "Sandy Beach," would make an excellent camping resort and if later on more facilities could be given to visitors by completing the road, I am sure it would benefit the park and make it more attractive. The road, when completed, would make an excellent fireguard and it is on the fireguards that we have to depend in this district for the saving of our feed for animals in the enclosure.

WATERTON LAKES PARK.

The work in this park has been chiefly repairs to roads and trails, which have been put in a good state of repair for traffic. About 1·5 miles of good graded trail have been added to the new road leading to the Yarrow cabin.

A blacksmith's shop has been built of peeled logs and a granary fitted up to hold the winter supply of oats.

A new cabin has been built at the Waterton bridge for the accommodation of the warden. The work was undertaken chiefly by the wardens, when not otherwise employed.

Twenty acres were ploughed and fenced on three sides, the lake forming the other boundary. This was seeded to oats, but owing to stock getting inside the fence and delay in getting in the crop, the farming operations were not a very great success.

Another fence was erected northeast of the lower townsite, but was not fully completed. This pasture is intended to hold the horses of visitors to the park during their sojourn at the upper townsite on the shores of Waterton lake. A nominal fee is to be charged, which will in time pay for the cost of the work.

Roads have been projected and will at a later date open up to the tourist some of the grandest scenery in the park, at present difficult of access. The colour scheme of this scenery is something not found in any of our other parks..

I would again recommend that the small corner of British Columbia north of the International Boundary, inaccessible except from Alberta, be incorporated in Waterton Lakes park. There is a road through the park constructed some years ago and later increased in length to reach a prospected oil field on the British Columbia side of the provincial boundary. Wagons and light rigs can travel this road, and with some outlay it can be made into a very good motor road by the construction of bridges and drainage on some soft spots.

Since Waterton bridge has been built it has been the means of permitting motorists to reach the townsite from the cities and towns of southern Alberta, and it is hoped that before long a number of permanent residences will be erected on the shores of the beautiful Waterton lake.

The forest ranger, John George Brown, better known in the neighbourhood as "Kootenai Brown," who was in charge of this park for several years, died in August,

1916, at an advanced age, and was buried at a site selected by himself overlooking the lower lake. He had lived in the locality for forty years and was the best known pioneer in the district. We also lost another of our wardens, Mr. George Knight, who went on overseas service, obtaining a commission in the 13th C.M.R., Pincher Creek, and made the supreme sacrifice in September, 1916.

JASPER PARK.

Colonel Rogers being still absent on military service, the charge of this park was given over at the beginning of the fiscal year to Mr. A. Driscoll, of Edmonton, who is engineer and acting superintendent during the absence of the regular superintendent.

The chief work and improvements consist of the following:—

A telephone line has been completed from Bedson to Pocahontas, a line has been built from Jasper to the Athabaska falls, and another from Medicine lake to Jack lake. These telephone lines are for the convenience of the wardens stationed in outlying districts, and will be extremly useful in case of fire or accident.

The usual maintenance work of repairs to roads and trails has been carried out and the townsite cleared of boulders.

A street lighting system has been installed, which is a boon to the residents.

Considerable work was done on opening up the road from a point on the Maligne road southwest of Jasper to the mouth of the Miette river. A bridge was constructed across this stream and a road practically completed for a distance of approximately three miles. A small bridge was also constructed across the mountain torrent and the grade practically finished to the bridge across the dry ravine. From there on a rough wagon road was constructed to facilitate the hauling of timber for Boulder creek bridge, which is still in course of construction. Eventually the road will terminate at the base of mount Edith Cavell, and tourists will be able to utilize it for the purpose of exploring the hidden beauties in the neighbourhood of this mountain and of the Whirpool valley.

At Brulé lake the Canadian Northern have built a spur to a coal mine known as the "Blue Diamond." This mine is producing some 700 to 800 tons of coal per day, which is being utilized by the Canadian Northern Railway Company. The coal is said to be of excellent steaming quality, and experiments are being conducted for the purpose of ascertaining whether it would be profitable to instal a series of cooking ovens in the vicinity of the mine. The company have established a townsite and provided it with water service and other modern conveniences.

The Edmonton Portland Cement Company have located and are erecting an extensive rock-crushing plant at G.T.P. Mileage 1024, some four miles north of Jasper, with the object of mining the rock a short distance west and parallel to the track and shipping this to their plant at Marlboro, some 86 miles northeast of Jasper.

Several new buildings have been erected in Jasper park which add to the beauty of the town, and I should like to see in the near future the matter of a water and sewer system taken up, as at present the residents are dependent on a temporary water supply, which is an expense to the department, and owing to its temporary nature no revenue is derived.

The Grand Trunk Pacific Railway Company have made many improvements at the intake at Cabin Lake and also at the dam at the head gates at Cabin creek, and as this winter the mainpipe line did not freeze, they had no trouble in providing their superintendent's residence with a continuous supply of water, also their own water-tower station building, and roundhouse.

The "Tented City" was opened again this year during the summer months and was fairly well patronized considering the war conditions still prevailing.

P. C. BARNARD HERVEY.

APPENDIX No. 2.

REPORT OF THE SUPERINTENDENT OF ROCKY MOUNTAINS PARK.

Notwithstanding what might have been anticipated to be adverse conditions arising out of the continuance of the world-wide war, viz.: the disinclination of those whose friends have gone to the front for travel, the calls on the part of the various patriotic funds, the demand for special service that is incident to war time and other contingent drawbacks to travel for pure enjoyment, the season of 1916 in Rocky Mountains park may be written down as a highly successful one, with money moving more freely than for years.

It is true, of course, that it will probably be some years before a tourist total is reached rivalling in numbers that of the season of the big expositions on the Pacific coast, when travel arranged by the C. P. R. included scenic attractions in the Canadian Rocky mountains *en route*. But while the numbers were greater in 1915, the season of 1916 was a better one for Banff. The class of visitor who came in 1916 was prone to linger longer and to disseminate his patronage more widely among cottage owners, hotel keepers and merchants. For instance, in the town of Banff, cottages were well occupied in July and September and were at a premium in August, while hotels experienced similar conditions in the same months, as did also the merchants, livery-keepers and others catering to the wants of the holiday-making population. The bathing establishments had gratifying returns, the Cave and Basin setting a new record for a single day's business.

In development work also good results were shown notwithstanding the labour shortage and the great reductions in our appropriations. The internment camps at Banff and Castle were again made use of and undertook a lot of valuable outdoor work, which could not have been carried on under ordinary war conditions. These works are dealt with separately under their respective headings.

The available money did not admit of undertaking some necessary extensions of public utilities, but those already in existence were kept in good repair under trying conditions, such as intense frosts in the early part of the year, and later abnormal floods. The main road from the east was closed for a day or two following the great flood of the year, when roaring torrents appeared where watercourses did not exist before, washing out culverts and much road yardage, covering up other parts with heavy boulders and gravel. There was some discolouration of the Banff water supply from the same cause, and some days of anxiety for the officials in connection with the water-works on Forty-mile creek; there was also a slight interruption to the telephone system by reason of fallen poles; and one or two of the smaller bridges were threatened, but when the water began to recede the anxiety terminated and things were immediately brought back to normal.

As has been indicated, the various departments of work are dealt with separately, and do not call for extended mention here. I would, however, submit that the policy under which all but one or two of the roads in the park were opened to automobiles has been justified by results. This policy has been the means of at least trebling the numbers of automobiles coming into the park from the east, and there are those doing business wholly dependent on the tourist traffic, who say that this policy was the financial salvation of the town of Banff in the early and late parts of the season. The same policy has been instrumental in multiplying the number of camping parties at favourable points on the main roads, parties being able, without inconvenience, to carry all camping paraphernalia in their cars and to make their quarters wherever the fancy seized them.

AUTOMOBILES.

During the year we issued approximately the following permits:—

Livery	14	At Arch (app.)	1,000
Private	53		
Drivers	18	Total	1,085

The system of registration is intended not so much as a producer of revenue as a means of keeping track of the owners of these vehicles while within our boundaries. No one, of course, would suggest that the comparatively insignificant sum collected from these owners was an adequate return to the department for the large outlay on the roads annually, an outlay which will probably increase in greater ratio to the increase in the number of cars.

During the year an arch was erected a short distance within the park boundary on the Calgary-Banff road, for convenience in the matter of registration of cars and owners, and collection of fees. A game warden's cabin was also built at that point, the occupant of which attends to the duties in connection with automobiles, besides covering a patrol area in the game protection service.

BANFF TOWNSITE.

No large new works were undertaken in the Banff townsite this year, but the roads and water and sewer services were kept in a good state of repair. The annual clean-up day in Banff, as in all the other townsites, was again a great success, and there have been further improvements in the direction of garden and lawn making. In this direction, the movement initiated by the school trustees in the provision of garden plots for the children was very successful, and sales of fresh fruit and flowers resulted in substantial sums going to the various patriotic funds in the district.

Efforts were continued in the direction of diminishing the noxious weed nuisance so far as the streets and boulevards were concerned.

The cleaning of the streets was adequately looked after, and local business men were asked to do some flushing after business hours on Saturday evenings during the summer season, with the object of having tidy streets and sidewalks over the Sundays.

The building trades were very quiet in the town during the year, no programme of new buildings being undertaken by the department. One or two substantial residences and one garage were erected, and permits were granted for a number of additions and other improvements to existing buildings.

NUISANCES.

During the summer months the special services of a sanitary inspector were obtained. By action and suggestion he was able to do good service in disposing of several nuisances of a minor character. It was necessary to tear down an old stable in contiguity to the first-class fire district, which was both unclean and a fire menace, and one or two outside closets were removed.

RECREATION GROUNDS.

Owing to the large number of young men who are away from the district, the football, cricket, and baseball patches at the Banff recreation grounds were in little demand during the year. The tennis courts, however, were in fairly constant use by ladies, and the swings and other attractions for children were in good demand during July and August.

During the year the Banff Gun Club secured the use of recently cleared land adjacent to the recreation grounds proper, to which access is had by a new bridge

over the lagoon and a short piece of road constructed this year. The ground is admirably adapted for trap shooting, and the club, which is well supported in point of membership, is being provided with a small pavilion for use as headquarters.

Angling in the park lakes and streams was reported as good, especially in the latter months of the season, although fears were expressed that some of the waters were being depleted. The matter is being inquired into, and if the depletion is found to be serious, an attempt will be made to remedy this condition.

About twenty guide-conducted parties registered out at Banff and a similar number at Lake Louise. These figures, however, do not cover the many private parties who were not accompanied by guides, and of whom we have no record.

Camping parties were more numerous than usual, owing largely, no doubt, to the ready access to charming new spots by automobile. The new permanent camping ground, set aside near the junction of the Spray and Bow rivers, was in use most of the season, and is declared to be an excellent location.

WINTER CARNIVAL.

The first annual winter carnival was held at Banff between the 5th and 17th of February, 1917, and as a preliminary undertaking to interest the general public in the winter attractions of our principal western summer resort, may be put down as having been an unqualified success.

The Winter Sports Club, which had a small balance from previous years, and a committee of citizens were responsible for the organization. In little more than a month's time the three western provinces were covered by forceful advertising which aroused keen interest. The programme presented was in every way thoroughly representative of winter sports with a few attractions not common anywhere but in Banff. The committee secured a large quantity of decorative lighting material and erected an ice palace and maze at the principal intersection in the town opposite the terminus of the long thrilling toboggan glide off the slopes of Tunnel mountain. The curling bonspiel was also fixed for the same period. The weather, unfortunately, was not all that could be desired for such an occasion, being somewhat soft in the earlier stages, but, on the other hand, from the point of view of the general tourist it was ideal for getting about in without discomfort from cold, and the thousand-odd tourists who came to Banff during the carnival expressed themselves as highly delighted and announced their intention of coming back in future years.

The sports included in the programme were: tobogganing, snow-shoeing, ski-ing, curling, skating, swimming in the hot baths, hockey, trap-shooting, pony ski-racing and indoor rifle shooting. Several dances were also held during the period.

The committee in charge of the work was drawn entirely from among the citizens, the parks local organization giving all assistance in its power. The guarantees necessary to float the venture and the considerable attendant expenses were also secured locally. These committees also have the matter in hand for next year when, with more time and the experience gained from this year, it is hoped an even greater success will be attained, so that the Banff winter carnival may become the premier winter event in the west.

GOLF COURSE.

The management of this course has been taken over by the department and will be part of the administration for next year. There is ample room, through good country, for the extension of this nine-hole course to the full medal size of eighteen holes. It is hoped the department will, if possible, undertake this important work during the season of 1917.

CAVE AND BASIN.

I much regret to report the death of Mr. D. D. Galletly, guide at the Cave, which took place in November, 1916. He was the oldest servant of the department in Rocky Mountains park and peculiarly fitted for this position, in which he came in contact with people from all parts of the world, and was in fact something of an institution in the locality. He has been very much missed. His position has been given to another Scotsman, Mr. D. Matheson, sr.

It was suggested last year that an arrangement should be made whereby a tea-room could be opened at the Cave and Basin during the summer. The crowds number many hundreds daily and it has been felt that something in the way of a refreshment room would add to the attractions and fill a long felt want.

As to last season, nothing need be said except that it was in every way excellent with a record set for the turnstile leading to the public pools.

HOT SPRINGS.

The opening of the Hot Springs road to automobiles justified itself in the increased business done at this establishment during the summer, which kept up steadily throughout the year, the winter months being notable for the number of rheumatic patients coming from the prairies.

ANALYSIS OF SULPHUR WATER.

In the month of December Mr. R. T. Elworthy, of the Department of Mines, was deputed to visit Banff and study the nature of the sulphur water, especially with regard to its radio-active properties. He spent several weeks in this vicinity dividing his time between the springs and a laboratory which was fitted up for him in the fire-hall building. His report has not yet been made public but it is understood that he was highly satisfied with his examination of the various waters and with the results obtained.

MORAINE LAKE CAMP.

From casual inquiry I am informed that the Misses Strick, Dodds, and Danks, who maintain a permanent camp at Moraine lake during the summer months, had a very good, though somewhat short, season last year. The place is one of the ideal camping spots in the mountains, and when the automobile road gets through to lake Louise this will be a favourite rendezvous for motoring parties. The road between lake Louise and Moraine lake is suitable for automobiles, but considerable work will have to be done to cope with the stones, etc., which come down annually with the freshets. Miss Dodds, who was in charge of the lake Agnes camp, reported that she also had a satisfactory season.

COPPER AT ELDON.

During the year several copper claims in the Eldon district have been acquired by the Eldon Mining Company, Limited. I am told that assays have given excellent encouragement, and a good deal of steady development work may be looked for in the future. These claims are situated about four miles south of Eldon, and the workings can be inspected by travelling along the road made by the miners.

DISCOVERY OF PHOSPHATE.

Early last year it was reported that phosphate deposits had been discovered in the park. An official from the Department of Mines was delegated to examine these discoveries, and made a report to the department, which deemed the matter of suffi-

cient importance to close the phosphate lands to claimants until such time as the deposits had been thoroughly examined, on account of their potential value from an agricultural point of view.

BANFF FISH HATCHERY.

The work at the fish hatchery has been very considerable during the year; a large number of young fry have been committed to various waters in the park. It is too soon yet to look for results in the angling lakes, but I have no doubt these results will begin to be apparent within the next few years.

A new summer hatchery was constructed by the Naval Department at the Spray lakes, and will be in operation next year under the same supervision as that which is getting such satisfactory results at the main building at Banff.

BANFF FIRE BRIGADE.

We usually have the experience of one bad fire every winter, and this year was no exception. Very early on the morning of the 12th of January some soldiers who were quartered at the internment camp, at the Cave and Basin, observed fire in the Harmon block, and immediately gave the alarm. The fire brigade, the police, and the citizens generally were immediately on the scene, but the interior of the building was a mass of flames before a stream could be turned upon it. The materials used in the construction of this large building, which from a photographic point of view was one of the show places of the town, were of such an inflammable nature that the fire practically consumed the entire edifice and its contents in the space of two hours. The weather at the time was exceptionally hard, but fortunately there was an excellent supply of water in strong streams, and this fact, together with the absence of wind, prevented the spread of the flames to adjacent buildings. I have nothing but praise for the brigade in this as in all previous outbreaks of fire in Banff since I became superintendent.

About half the total members of this volunteer organization are at the front with various regiments. There have, fortunately, been few dangerous fires during the past year, but when a call is sent in the brigade turns out with its apparatus in the alert, prompt manner which I have so often praised in the past. There is a good deal of apparatus needed for the brigade as yet, but provision has been made for the immediate requirements of the men in the estimates for 1917. The hall is in excellent shape and everything, outside and in, is spick and span.

TRANSPORTATION.

During the year the department furnished automobiles for myself and the general foreman. These have been of great convenience for us both in getting about to the various works, and in the case of the general foreman especially, enabled a great deal more work to be covered than was possible with horse and rig alone.

HAY.

For a considerable number of years it has been the practice of the park authorities to purchase all the hay required for the animals. This has been found to be a somewhat expensive and unsatisfactory process on account of difficulties of transportation and delivery. A part of the ground reclaimed by alien labour contiguous to the recreation grounds was set aside and some acres of it have been ploughed, with a view to testing the possibility of being able to grow our own hay. The preliminary experiment is being made with timothy, and it is hoped that we shall be able, by an extension of the ground, to grow all the hay required by us annually.

ELECTRIC LIGHTING.

Though no actual construction work was done during the year the question of getting a local electric plant was advanced a step by an exhaustive examination of various possible projects. The report submitted by the Government engineers who took up the examination is now in the hands of the authorities.

ROADS AND TRAILS.

The making, maintenance and repair of the roads and trails in the park are probably the most important of our works, and, in addition to the work done by the aliens, while we made no new roads there was a good deal of repair work to be done.

We had a small gang on the Moraine lake road at Lake Louise, early in the year, raking the entire length of the road from the chalet to the Moraine camp, and attending to the bridges and culverts. This is work which, as already mentioned, is necessary every year, and may be looked upon as a fixed charge.

Castle-Vermilion.—This road was rather badly cut up by lumbering operations in the early part of the summer and its condition merits somewhat extended attention when lumbering operations cease in the locality.

Calgary-Banff.—The trouble experienced on this road arose mainly from the summer freshets. Large portions of the road were under running water with the result that great quantities of boulders were deposited on the highway, in consequence of which the road was closed to through traffic for some days. Many culverts were washed away, and others had to be put in at newly made water courses where there were none before. In the neighbourhood of Exshaw there was a cave-in on the line of a long culvert, and at Anthracite we had the old trouble with the Cascade river overflowing its banks and inundating a long stretch of road to the east. Considering everything, however, it cannot be said that the road is not in good shape, but it is quite evident that there will have to be considerable work done between Banff and Bankhead and Banff and Kananaskis as soon as it is possible, owing particularly to the nature of the traffic on this road, which is entirely confined to automobiles.

Tunnel Mountain drive.—This is one of the spectacular drives in the park, but owing to the "corkscrew" on the line of route, it has so far been closed to automobiles. With the elimination of this corkscrew there would be no reason why automobiles should not use this road as traffic goes only one way—from west to east. Engineers spent some days on a survey this year with the object of finding a route which should do away with this corkscrew and it is hoped that the necessary work will be undertaken during the coming year. In all other respects the road is in fairly good condition.

Up the Spray to Hot Springs.—The interned aliens were employed in cutting out the road starting at the Spray bridge on the road to the Loop, up the Spray river, across a new bridge put in at the 5½-mile point and then up the hill to the Hot Springs, opening up the round trip which should be one of the most popular drives in the locality. There is a shorter route opened by the same road, the return being made by Government hill and the Banff Springs hotel on the present Spray road. The right-of-way has been cut out, but there are stumping and grading to be done. This winter a beginning is to be made with the culvert work, when the financial situation will allow. I have no doubt the completion of this road will be one of the first important public works to be undertaken by the department.

The Rock-crusher.—This machine, situated at the foot of mount Rundle, adjacent to a big slide on the western face, has been fairly constantly at work during the year, and large quantities of the various grades of road material were put up, but not by any means more than we could use. The material is excellent for road construction, and we intend to keep the machine going as much as possible when weather and funds permit.

The Loop drive.—In the summer of 1916 we remade and widened that part of the Loop drive between the Spray bridge and the first putting-green on the golf course. This part of the road is one of the best stretches in the park and is a favourite with automobile drivers and pedestrians. The road could accommodate three ordinary vehicles abreast if necessary, while the surface is hard and even, with adequate drainage. The remainder of the road has been widened and repaired, so that the whole seven miles are in excellent shape.

Cave avenue.—This road, which was made over again two years ago, widened and surfaced with material produced by the rock-crusher, is a model of what parks roads should be. It bears up well under heavy all-the-year-round traffic, and continues to be in very excellent shape. During the winter there was some trouble with the ice backing up from water oozing out of the hillside, and eventually blocking up the culverts at the spot in question. The road, however, was continually open for traffic.

To Sundance canyon.—This road is one of the best of the scenic drives around Banff, and was opened to automobile traffic during the year, following certain widening and brush-cutting operations. It is given continuous attention during the year and remains in excellent condition.

Spray avenue.—This road gives access to the Banff Springs hotel, and has to bear a very heavy traffic during the visitor season. It was resurfaced from the hotel to the Brett hospital during the year, and continues to be in every respect a first-class road.

To lake Minnewanka.—This road was also opened permanently to automobile traffic during the year, after certain repairs and widening operations on the "Hog-bank" had been completed. It is a favourite drive with persons using all classes of vehicles, and its popularity calls for our giving the state of the road almost constant attention. The part from Banff avenue to Bankhead has to bear heavy traffic, under which it stands up well.

Canmore streets.—Flood conditions were very bad in Canmore district during the summer and a good deal of money was spent in putting the roads into condition. These were finally put in excellent shape and should not need more than ordinary maintenance for some little time unless similar conditions arise in the way of river flooding.

Castle-Laggan.—This road is not yet through to Laggan, although I am hopeful that it will be open to traffic between Banff and the more western resort this year. The part of the road to Castle, which has been open for some years, did not require much attention, although there are some low-lying spots which should be surfaced soon, to avoid mud during wet weather. It was a very popular drive with automobilists, and we have given attention to bad corners on the route, one very bad corner being dynamited out at a curve overlooking the Vermilion lakes. Repair work was also undertaken at and near Castle. The construction work on the road was done largely by alien labour from the summer camp at Castle, and good progress was made. I am indebted to Mr. J. M. Wardle, Highways Engineer, for the following notes on the work accomplished:—

"Construction work on this road was carried on throughout the season by means of alien labour, steam shovel and day labour, and satisfactory progress was made.

"A new road, 18 feet wide, was opened up from station 149 to station 356—a distance of four miles. The road between these points is practically completed except for a thousand feet in the Eldon hills. Station 356 is one mile east of Eldon siding, the road at this point reaching the flats after winding over the Eldon hills.

"Besides the construction of this portion of the road, considerable work between station 149 and station 60—left unfinished in 1915—was completed. The greater part of the road from station 0 to station 132 was also surfaced with gravel.

"A second-hand steam shovel, purchased by the department, did good work in connection with the heavy grading in the Eldon hills. During the period of its operation 4,600 cubic yards of earth, loose rock and solid rock were moved.

"Besides the construction of the various box culverts necessary for the draining of the road, the bridge over Baker creek—station 500—was practically completed. This bridge is of 43 feet span, and consists primarily of two steel 'I' beams, supported on concrete abutments. Besides being of a permanent nature and low in cost, this bridge is of good appearance.

"Eleven miles of the road still remain to be built before lake Louise is reached, but as the greater part of the portion will be easily constructed, it is confidently expected that the road will be completed during the coming season."

To the Hot Springs.—After certain widening work had been done at some of the sharper turns on the Hot Springs road, the route was thrown open to automobile traffic, and the road was heavily patronized during the year. All grades of cars make the 800-foot ascent easily, but there is some surfacing work that should be undertaken as soon as possible.

Roads—General.—That part of the road leading to the Loop drive, where it curves under the rock immediately below the Banff Springs hotel, has been widened about twelve feet, by filling that width of the lagoon with loose rock taken from the quarry about half a mile up the Spray river. This was rather a dangerous corner for automobiles, but now is as safe as it can be made, with plenty of room to pass at any speed.

The hill from the junction of the Banff-Bankhead roads in the Anthracite direction should be surfaced, and some of the banks cut and the road widened. This road bears all the traffic from the east, coming and going, on the Banff-Calgary road.

Some repairs are contemplated early next year to the rocmac road from the railway station in Banff to the Bow River bridge. It has worn well since it was laid, but is getting somewhat corrugated owing to heavy automobile traffic.

All the usual maintenance work was well attended to during the year.

The making of the new road into the St. Julien subdivision, from Wolf street to the Junction with the Tunnel Mountain drive, had to be stopped in the early winter owing to hard weather. Good progress was, however, made on heavy cutting work, and the road should be completed early in 1917, and then it should make a most attractive short circular drive to and from town via a fine scenic route.

ROADS IN THE PARK.

	Miles.
Kananaskis to Banff	35
Banff to Hot springs	3
Banff to Sundance canyon	4
Banff to Lumber camp on Spray river	8
Tunnel Mountain drive	5
Lake Minnewanka drive	9
Banff to lake Louise (unfinished)	41
Lake Louise to Moraine lake	9
Bankhead road to Buffalo paddock	1
Town streets, including St. Julien road	17
Loop drive	7
Canmore station to mines	2
From junction of Banff-Louise roads to British Columbia boundary via Vermilion	11
RIGHT-OF-WAY CUT.	
From Spray bridge up Spray via new bridge to Hot Springs	7
From Government hill to new Spray bridge	1
SURVEYED.	
From Cave and Basin to Middle spring	1
Total	161

TRAILS.

The game wardens' staff, as usual, gave a good deal of attention to all the trails in the park during the year, cutting out fallen timber, getting rid of protruding rocks and doing other necessary maintenance work, in the performance of their inspection and patrol duties.

The only new trail undertaken during the year was that up Johnson canyon. The making of this most spectacular trail of easy access from the automobile road between Banff and Castle will open up a scenic short excursion which is without parallel on the line of this road, and which is sure to be a regular mecca for travellers along the route. It entailed the making of a number of bridges crossing and recrossing the creek which at certain seasons of the year contains a large stream of water, but this will enhance the attractiveness of the trail.

WATER AND SEWER SYSTEMS.

No new extensions of the Banff water and sewer systems were undertaken during the year, although we have the material at hand to make the necessary extensions as soon as the finances will permit. Both systems were kept in first-class condition during the year by our own staffs.

BRIDGES.

Trouble was again experienced with the overflow of the Cascade river at Anthracite, but without injury to the bridges there, which had been lengthened by the addition of the remaining span of what is known as the "Duncan bridge" farther down the river. A fairly successful attempt was made to divert this stream to its former channel under the steel span at the west end of this structure, with a view to eliminating the annual flooding of the other end of the bridge when the freshets come down in the early summer.

A handsome new bridge was put in at Baker creek, on the line of the automobile road, some miles west of Banff, which should be in use next year; a small new bridge was constructed at the recreation grounds; a number of culverts on the Banff-Calgary road were floored and replaced; the bridge seven miles up the Spray river, on the trail to the Spray lakes, was repaired and a new bridge put in five miles up the Spray river on the new automobile road to the Hot Springs. The bridge at Castle was repainted, also the new one on the Spray already mentioned. The Bow River bridge was refloored and painted by the Department of Public Works, also the Spray River bridge at Banff.

BUFFALO PARK.

There is nothing new to report at the buffalo enclosure, other than the information given in my monthly reports as to the conditions and increase or decrease of the animals in the enclosure. It is necessary to provide for a rather important scheme of re-fencing, owing to the rotting away of many of the posts, and a considerable sum of money has been put down in the estimates for next year to take care of this work. During the year the alien prisoners of war have been doing a considerable amount of clearing work at the lower pasture and this will give a large amount of extra ground for next year.

At the time of writing the following animals are in captivity at the Buffalo enclosure:—

Buffalo	13	White tail deer	3
Moose	10	Persian sheep	6
Elk	95	Rocky Mtn. sheep	16
Angora goats	18	4-horned sheep	23
Rocky Mtn. goats	3		
Yak	16	Total	214
Mule deer	11		

CANMORE.

There is nothing new of very great importance to report at this townsite. The pressing question for the people here is that of river erosion. During the late summer, when the floods in the Bow river and its many tributaries west of Canmore were at their height, a very considerable area of the townsite adjacent to the river was under water and one or two small bridges on spur lines were inundated. The river subsided without doing much damage, but a considerable amount of river protective work should be undertaken this year.

All the streets in the town are in good condition. A gang of men was put on there for some weeks during the summer, filling up holes, attending to bridges, and generally putting the roadways into good repair.

I have on several occasions called attention to the necessity for water and sewer systems at this point, but it is unlikely that any expenditure of this kind can be undertaken while the war continues.

EXSHAW TOWNSITE.

The only event of note here during the year was the reopening of the cement plant, which has been closed down for some time. The work done this year was largely preliminary to opening up the plant to full output early in 1917.

LAKE MINNEWANKA.

Some clearing on the townsite was done by a gang of aliens during the early spring, when some of the streets were cut out according to the survey, with the extra purpose of providing effective fireguards. The opening of the lake road to automobiles last summer made itself felt in the increased numbers of visitors, and, generally speaking, a good season was experienced. Some work was also done in connection with the wharf, with the object of making the handling of the lake steamers more convenient.

BANKHEAD.

This townsite is administered by the Bankhead Mine authorities, but the superintendent there has always shown a desire to work in harmony with the parks branch. Some cleaning up was done at the time this work was general in the park.

The cemetery provided at Bankhead, in which the Miners' Union purchased a considerable block of lots, has not yet been used for interments, a preference being still shown for neighbouring burial places. The ground to be immediately used, however, is enclosed temporarily and has been properly staked.

FIRE AND GAME PROTECTION.

The work of the fire and game wardens' department, except in the case of game poaching prosecutions and similar breaches of the game regulations, does not call for a great deal of comment this year. The work went along harmoniously in all its branches, and we were fortunate in having only one small fire during the year, which did no serious damage.

Under another heading, I have already referred to the construction of the spectacular trail up Johnson Creek canyon as being the new trail of the year, but it should be stated here that the work of construction was done wholly by the wardens, as was the keeping clear of the existing trails and other similar work incidental to forest protection.

Two new warden's cabins were built during the year, a great deal of the work being done by the warden's staff. These cabins, situated at Kananaskis and Canmore,

on the main road between Calgary and Banff, are spacious erections of their kind and well built and appointed.

Some very important additions were made to our forest fire-fighting apparatus with a view to increased mobility and efficiency These additions consist of power-pumping units with the necessary hose and other appliances, and are so constructed as to be rapidly moved from place to place by either automobile on the roads or gasolene speeder on the railway, along the lines of which fires are the most frequent.

In regard to prosecutions, there were two during the year, one of which was of great importance, involving as it did three charges against a well-known guide and outfitter. This was a case where a guide was convicted of killing Rocky Mountain sheep at or near the saltlick on the automobile road, and of having part or parts of the carcass in his residence when it was searched. He was fined in all on the three charges $100 and the costs of the court; the carcass and scalp were confiscated, and his license as a guide in the park cancelled. The other case was one in which a man in the Bankhead district was convicted of having the carcass of a deer illegally in his possession. He was fined $50 and the costs of the court; the carcass was confiscated and he was warned out of the park. Cases such as these, pursued to conviction, will have the effect of putting down the killing of game, which is apt to be a temptation when the game is practically tame, while the new regulations, imposing much heavier penalties, will be a still further deterrent.

FISHERY INSPECTION.

The fishery inspector reports the fishing in nearby streams not so good this season as last. Outside points as regards steam fishing gave fair returns, Myrtle, Boom, Consolation and other park lakes giving some fine catches. The inspector also reports that some extended attention should be given to the trails leading to Mystic and Hogarth lakes during next year, and also that a trail be cut not only to but around the Little Vermilion Summit lake, as between that lake and the motor road west, are some of the finest scenic spots with several small lakes that will be stocked with fish as the hatchery returns begin to count. With Boom lake being used as a point for getting spawn for the hatchery it might be advisable to close the lake and the spawning beds to general fishing for a number of years, as this year, on account of the spring opening late, the fish were found in the spawning beds well into July and great numbers were taken by the timber men working nearby.

TIMBER AND GRAZING.

The work in this department does not call for extended notice although there was considerable activity during the year. We issued approximately 80 timber permits, and 34 grazing permits covering 222 horses and 156 cows.

ALIEN CAMPS.

During the year the alien prisoners' camps were situated, as in former years of the war, at Banff and Castle. The work done at Castle was in connection with the construction of the Banff-Lake Louise automobile road, to which reference is made under another heading.

At Banff the aliens spent their time in widening the road at the Spray bridge, in widening and cutting off a corner of the automobile road opposite the Vermilion lakes, cutting and loading wood, and in clearing out brush at various points around the townsite and at the buffalo and animal paddocks east of the town.

DEATH OF OFFICIALS.

In the middle of the month of January we lost Mr. John F. Morrison, our timber and grazing inspector, who suffered a long and painful illness. He had not been an official for more than three years, but he was well known in the park on account of the nature of his business, which brought him into contact with a large number of people.

COMMISSIONER OF POLICE.

I regret to have to report the death of Mr. Silas H. Carpenter, Commissioner of Police, and Magistrate and Parks Inspector. He made Banff his headquarters during the two years he held office. He was a man universally respected, both for his character and the thoroughness of his work. He has been succeeded by Mr. Barney W. Collison, the well known Calgary lawyer, who is continuing the work along the lines laid down by Mr. Carpenter.

VISITORS.

During the summer Their Royal Highnesses the Duke and Duchess of Connaught, Princess Patricia and a large party spent a considerable time in Banff, and also visited other districts of the park. The visit was not official but it was understood that Their Royal Highnesses had enjoyed a very pleasant holiday.

Two parties of the Empire Parliamentary Association from Australia and New Zealand visited the park during the year, both parties spending two days here, one going and the other coming from the Imperial Parliamentary Conference in Great Britain. We were able to show the members of both parties the principal beauties of the park in which they displayed much interest.

Later in the year the members of the Dominions Royal Commission visited the park, accompanied by Sir George E. Foster, K.C.M.G., Minister of Trade and Commerce. The weather was very cold and wet during the period of their short stay at Banff, but they nevertheless saw the various springs, bath-houses and the animals in captivity.

S. J. CLARKE.

APPENDIX 2a.

REPORT OF THE CURATOR OF THE BANFF MUSEUM.

I was able to collect considerable material during the past year and to get quite a number of specimens named and returned to me, some of which I have been able to get properly labelled and arranged.

Additions.—Birds.

Canvas-back duck, female. Collected by curator. (*Marila vallisneria*). In fine spring plumage. Rare in Rocky Mountains park.

Four oldsquaw, long tailed duck. (*Harelda hyemalis*).

Horned grebe, male. Collected by curator. (*Colymbus auritus*).

Richardson's grouse. (*Dendragapus obscurus richardsonii*).Male, dark specimen. This is a form of the blue grouse and was found dead under the snow on Sulphur mountain trail in February, with its windpipe quite swollen near the heart. Collected by the curator.

Northern raven, male. Collected by C. V. Phillips, fire and game warden. (*Corvus corax principalis*).

Western horned owl, female. Collected by C. W. P. Phillips, fire and game warden. (*Bubb virginianus pallescens*).

All these birds are in fine plumage.

Unmounted specimens.

Study skins of Lincoln's sparrow, white crowned sparrow and thrush.

I had the pelican which died in the zoo skinned and stored.

Several people informed me that they had found the wild ducks to be diseased, perhaps on account of the rather cool, cloudy, damp summer. The grouse seemed similarly affected from the same cause.

Mammals.

Canada beaver (*Castor canadensis*), female. From near Midnapore. This very large beaver was presented by Mr. Dan Patton and has been mounted with the beaver-felled balsalm, poplar and chips. The background of the case has been painted with a scene from the brush of Mr. S. C. Vick. This beaver weighed 70 pounds. The largest known on record.

The longtailed mouse, jumping or kangaroo mouse. (*Zapis hudsonius*). Presented by Mr. Dan Patton, of Midnapore, Alta.

Insects.

Collections of all kinds of insects were made at every opportunity. Some mountains may be the habitat of quite a number of one kind of insect which will be wanting or rare elsewhere in the park so that I come across interesting localities each year in which I find different specimens that have not been taken before in the Rocky Mountains park.

Butterflies.

Colias Nastes, an Arctic species in varying forms, was taken on Cascade Mountain slope, away from Banff, and *Parnassius Smintheus* was common after the middle of September in mount Aylmer pass.

Dr. C. Gordon Hewitt collected a specimen of *Gryloblatta Sp.*, on a trip up Sulphur mountain with the curator. This is an altogether new insect, a connecting link between a cockroach and cricket, and was first taken by Dr. Walker of the biological department of the University of Toronto.

An entomological cabinet of fourteen drawers was received early this year, from the Geological Survey through Mr. Harlan I. Smith, and is very acceptable, as the original insect cabinet is full and much material remains to be properly cased for exhibition and proper preservation. Duplicate insect boxes, for storing duplicate material, etc., were purchased.

Spiders.

Spiders were collected on all my collecting trips. These Aracnids are found everywhere in the park. A few are even found on the tops of the most barren and bleak mountains. The jumping spiders are perhaps the most interesting. Some of the males are beautifully coloured. The eastern house spider is not found in the park. None of our spiders are considered poisonous in their bites, although the red mite, which looks much like a spider, may be poisonous. Spider's webs are sometimes seen over depressions made in the snow by people going up the mountain in the spring or early summer. Some of the midges, etc., and of the millions of snow flies are caught in these webs. Among some of the more interesting spiders collected were the following:—

Epeira Carbonaria.—From rock sides Cascade mountain. This spider would drop so quickly and disappear under the rocks that it was often difficult to collect, being accustomed to disappear at the slighest noise.

Lycosa Fumosa.—From Cascade mountain.

Gongyledium.—A new species of. Found on the snow on Sulphur mountain.

Tinetinus Armatus.—Found on the snow on Sulphur Mountain in the early spring.

Lathys Pallida.—A new species of jumping spider. Small, black, and a little irridescent, about twelve specimens from Simpson's Pass summit.

Plants.

Much material has been sent out to specialists of mosses, lichens, grasses and flowering plants proper; while some have been named, the determination of others will require more time on account of the conditions at present existing. Under instructions from the commissioner, I sent all the plants in the museum to Mr. J. M. Macoun, Botanist, Geological Survey, for revising and bringing up-to-date as to nomenclature.

I find it very useful to keep dried specimens of all western plants on hand, as visitors often ask for the name of some plant they have seen along the railway, while passing through the prairie or mountains. To this end, while I am away on holidays or on other work, I make a point of collecting as much as possible about the locality. Of course the plants in the vicinity of the park should be kept in the museum. The summer of 1916, was a season of considerable rust amongst the wild vegetation, for instance, the sope berry, often called the buffalo berry by mistake (*Shepherdia canadensis*), was very much affected by rust. These berries have never been noticed

in this rusted condition before. Some wild flowers are becoming rare about Banff, namely the yellow lady's slipper (*Cypripedium pubescens*), although never very abundant, is now almost extinct. It has always, so far as known, been confined to rather a small area. The yellow lily (*Lilium montanum*), a beautiful showy flower, is far less abundant than previously.

Lovers of wild flowers should not pull up any flower by the root nor pick a bouquet only to throw it away before reaching home.

PHENOLOGICAL NOTES.

Most birds were later than usual in their return in the spring. On account of several snow storms in May, many ducks rested on the Bow river, some never seen here before, a few of which were collected. Wild plants were also later than the average date.

TREES.

In the winter of 1915-16 a large number of conifers were affected climatically many of the leaves developing a scorched appearance. These leaves fall off or blow off and in most cases the trees affected resume their usual appearance in about two years time. In the early part of the present year the trees near Kananaskis particularly suffered though it is possible they may have been affected by a grub at the roots. The matter would be worth investigating.

COLLECTING TRIPS.

Collecting trips in the immediate vicinity of Banff were often taken over the automobile road. Squaw mountain, Spray road, Loop, Banff avenue to Lake Minnewanka and side trails, Tunnel, Rundle and Sulphur mountains, while Cascade mountain, mount Aylmer, Monarch mountain were climbed and the vicinity of each explored.

Cascade mountain.—August 23 to 27 and again August 31 to September 2, camping in what is known as the Ampitheatre, collecting trips were made in all directions. One of the best, if not the best, views of mount Assiniboine is had from the top of Cascade mountain. From the Ampitheatre a shorter trail to the summit could be made, which would also avoid going over much badly laid down rock. Quite a number of fossil corals were found here. In some of the snow pools were noticed several species of rare and beautiful algae.

Mount Aylmer; mount Aylmer Pass.—September 18 to 23, camping in mount Aylmer pass under perfect weather conditions, collecting considerable material on every-day walks and climbs. Mountain sheep, goat, coyotes, mule deer, wolverine and picas were seen; also ptarmigan and eagles. From the top of mount Aylmer one of the best views of the prairie, including Calgary, may be seen; also of mount Assiniboine. It would be possible to make a shorter trail up this mountain than that by which the summit is now reached.

Simpson's Pass Summit and Monarch Mountain.—July 25 to 29, when collection of spiders and insects in general was made. A fine view is obtained from the summit of Monarch mountain.

Exshaw and neighbourhood.—June 6, made some collections here.

Sulphur mountain.—Every two weeks in August and September different portions of the mountain were explored for information and specimens.

REQUIREMENTS.

More cases are really required before anything else. There are quite a number of birds in storage, because no room can be found for them in the present filled-up cases. More specimens of full sized mammals, expecially of the larger sizes are needed; also more birds.

I again have to acknowledge kind assistance from: Dr. C. Gordon Hewitt, Dominion Entomologist; Mr. J. W. F. Sladen, Apiarist, Experimental Farm; Mr. P. A. Taverner, Ornithologist, Victoria Memorial Museum; Mr. J. M. Swaine, Forest Insects, Experimental Farm; Dr. M. O. Malte, Agrostologist, Experimental Farm; Dr. H. T. Güssow, Dominion Botanist; Mr. G. K. Merrill, Rockland, Maine; Dr. Otto E. Jennings, Pittsburg, Pa.; Mr. F. H. Wolley-Dodd, Midnapore, Alberta.

N. B. SANSON.

APPENDIX 2b.

REPORT OF THE ALPINE CLUB OF CANADA.

The Alpine Club-house was open all the season, not only for the convenience of the members of the club, but also to give much needed information about the mountain country to strangers.

Among the visitors who come to Banff there seems to be a growing desire to see more of the place and its surroundings than is comprised in the usual hotel routine. While serious climbers make the club-house their headquarters, there are many visitors who would gladly make the simpler climbs if there were resident guides available, not only for climbing, but to make plain and practical the many expeditions of not too strenuous an order which radiate from Banff.

Much appreciation was expressed of the new trail from the Middle springs to the Cave and Basin. It undoubtedly led many bathers to the Government baths, who would otherwise have gone elsewhere.

The most striking climb of the season was the first ascent of mount Louis. Though of no very great height it was declared by its climbers—members of the party which conquered mount Robson—to be one of the most difficult rock climbs in the Canadian Rockies. Mounts Norquay, Edith, Cascade and Rundle were also climbed.

A canoe trip down the Bow, from below the falls to Exshaw, was found most interesting, though by no means suited to a novice.

The river is decidedly one of the best places from which to see the mountain peaks and the use of it for such purpose is worthy of every encouragement.

It would be appreciated if a good trail were cleared out and kept open on the east side of the Spray river from the new bridge four miles up, back to Banff. Such a trail would be of the greatest service to riding parties, affording a delightful round trip up the valley by the road and back through the forest.

The visitors to the club-house were drawn from the following places:—

Canada—

British Columbia.—Cameron Lake, Kelowna, Rossland, Sidney, Vancouver, Victoria, Wilmer.
Alberta.—Calgary, Edmonton, Green Court, Innisfail, Lethbridge, Macleod, Vegreville, Vermilion.
Saskatchewan.—Kerrobert, Regina, Prince Albert.
Manitoba.—Brandon, Winnipeg.
Ontario.—Hamilton, Ottawa, Sudbury, Toronto.
Nova Scotia.—Windsor.

United States—

Illinois.—Galesburg.
Indiana.—Lafayette.
Maryland.—Annapolis.
Massachusetts.—Boston, Brookline.
Minnesota.—Minneapolis.
Missouri.—St. Louis.
New York.—Brooklyn, New York.
Washington.—Seattle.

Scotland—

Glasgow.

HEALY CREEK CAMP.

The eleventh annual camp of the Alpine Club of Canada was held in Healy Creek valley, not far from Simpson pass, from the 13th to the 31st of July. It opened up a new region of interest, the Swiss guides declaring that while there were few peaks of first-class attraction from the climbing point of view, the neighbourhood of Egypt lake, the Pharaoh peaks and Shadow lake as the most beautiful known to them in the Rockies.

A motor launch was taken for about eight miles up the Bow river to a landing, whence a new trail had been cut to join the main trail from Banff to Simpson pass. This proved to be a most popular innovation and in future it is probable that most travellers to Simpson pass and the mount Assiniboine country will arrange for their ponies to meet them at this landing, thus cutting out a part of the trail of no particular interest.

A subsidiary camp was pitched near the summit of Simpson pass, on the shore of the lake, by Bill Peyto's copper claim, which commanded delightful views, and was a fine centre for excursions.

War conditions still continue, and the attendance was small in comparison with earlier years. Still the enthusiasm was great, and the love and knowledge of Canada's mountain country were extended.

Among the principal ascents made were those of mounts Monarch and Brett, and the unnamed peak next to mount Brett.

Excursions radiated in every direction, the most popular being one which occupied two days to Shadow lake via Haiduk pass and returning by the northern shoulder of the Pharaoh peaks.

In addition to the annual meeting a special meeting was held at the Simpson pass camp to synchronize exactly with one held at the war front by Lieut.-Col. C. H. Mitchell, D.S.O., the eastern vice-president. It was a most solemn function, a fierce thunderstorm adding dramatic effect to the five minutes of solemn commune with those on the European front.

After camp, several expeditions of exploration were made by different members of the club, of which detailed accounts will appear in the next club *Journal*. These include trips into fresh portions of the Purcell range, the ascent of mount Longstaff and a minor peak in the same range. For the first time on record an expedition was made into the unknown Cariboo range. Sand creek and the Little Shuswap valleys were explored and the region found to be of extreme interest.

Professor Coleman continued his explorations of the mountains of Labrador, and journeys of less importance were made.

In an article in the last number of the English *Alpine Journal* it stated truly that the more travelling and climbing were carried out in the mountains of Canada, the more unknown country seemed to await the mountaineer.

It is an interesting fact that in a report made by the secretary of the American club of the climbs of importance made by its members in 1916, only one peak was mentioned which was not in Canada, and all the mountain climbers mentioned except one belonged to the Alpine Club of Canada.

Among the better known attendants at the camp were Sir Jas. Outram, whose book on his early climbs in the Rockies is a Canadian classic; the Hon. Mr. Justice Galt, of Winnipeg; Dr. Stone, President of Purdue University, Indiana; Prof. J. F. Lewis, of the University of Alberta; Prof. C. B. Sissons, of Toronto; and Mr. R. H. Campbell, Director of Canada's Forestry Department.

There were present members of the English, Swiss and American Alpine Clubs, of the Appalachian Mountain Club, of the Mazamas and the Mountaineers, of the Royal Geographical Society and the Linnaean Society.

Those present at the camp were drawn from the following places:—

Canada—

British Columbia.—Cameron Lake, Kelowna, Rossland, Sidney, Vancouver, Victoria, Wilmer.
Alberta—Banff, Calgary, Edmonton, Lethbridge, Vermilion.
Saskatchewan—Regina.
Manitoba—Winnipeg.
Ontario—Hamilton, Ottawa, Toronto.
Nova Scotia—Windsor.

United States—

Illinois—Chicago, Galesburg.
Indiana—Lafayette.
Maryland—Annapolis.
Massachusetts—Boston, Brookline.
New York—Brooklyn, New York.
Washington—Seattle.

Switzerland—

Interlaken.

APPENDIX No. 2c.

ANALYSIS OF NATIONALITIES OF VISITORS TO ROCKY MOUNTAINS PARK.

Visitors to Cave and Basin from April 1, 1916, to March 31, 1917.

Canada	10,769
United States	12,182
England	121
Scotland	14
Ireland	8
Australia	58
New Zealand	29
South Africa	7
Argentina	4
China	1
Japan	11
Chili	3
Alaska	7
Russia	4
Italy	3
India	2
Total	23,223
Paying bathers	27,275
Free bathers	1,703
Total	28,978

STATEMENT of persons registered at the Banff Springs hotel, season 1916.

Manitoba	22
(Winnipeg)	355
Saskatchewan	189
Alberta	1,427
British Columbia	210
Total	2,203
Newfoundland	3
Prince Edward Island	6
Nova Scotia	7
New Brunswick	11
Quebec	244
Ontario	487
Total	758
Maine	24
New Hampshire	11
Vermont	11
Massachusetts	312
Boston	206
Connecticut	114
Rhode Island	44
New York	295
New York City	1,234
Pennsylvania	224
Pittsburg	38
Philadelphia	296
New Jersey	195
Delaware	17
Maryland	82
District of Columbia	84
West Virginia	24
Virginia	72
Total	3,283
Kentucky	52
Tennessee	51
North Carolina	6
South Carolina	9
Georgia	40
Alabama	37
Mississippi	12
Louisiana	31
Florida	10
Total	248
Ohio	115
Cleveland	134
Cincinnati	74
Detroit	108
Indiana	95
Indianapolis	39
Illinois	218
Chicago	607
Iowa	118
Total	1,408

STATEMENT of persons registered at the Banff Springs hotel, season 1916.—*Con.*

Missouri	46
St. Louis	107
Kansas City	45
Kansas	32
Arkansas	10
Oklahoma	15
Nebraska	37
Texas	73
Total	365
Wisconsin	74
Milwaukee	74
Minnesota	64
Minneapolis	159
St. Paul	63
North Dakota	30
South Dakota	4
Total	468
Washington	182
Oregon	110
California	293
San Francisco	191
Los Angeles	229
Total	1,005
Montana	26
Idaho	2
Colorado	20
Utah	6
Arizona	12
Total	66
Alaska	3
West Indies	13
Mexico and Central America	2
South America	7
Total	25
England	85
Ireland	4
Scotland	12
France	10
Belgium	2
Switzerland	1
Holland	7
Other European countries	11
Total	132
Australia	112
New Zealand	49
China	50
India	27
Hawaii	41
Philippine Islands	14
Asia	4
Japan	26
South Africa	5
Straits Settlements	14
Persia	1
Fiji Isles	2
Total	345

Conducted Parties (otherwise unlocated).

Raymond & Whitcomb	56
Thos. Cook & Son	20
G. K. & B.	48
Pittsburg Common	25
Can. Credit Man's Association	40
Frank Tours	8
Total	197
Unlocated	121
Total, 1915	22,019
Total, 1916	10,624
Decrease	11,395

STATEMENT of persons registered at Chateau Lake Louise, Lake Louise, Alta., season 1916.

Manitoba	21
(Winnipeg)	222
Saskatchewan	128
Alberta	504
British Columbia	164
Total	1,039
Prince Edward Island	2
Nova Scotia	11
New Brunswick	19
Quebec	170
Ontario	447
Total	649
Maine	26
New Hampshire	32
Massachusetts	328
(Boston)	309
Vermont	15
Connecticut	162
Rhode Island	93
New York	348
(New York City)	1,272
Pennsylvania	206
(Pittsburg)	114
(Philadelphia)	328
New Jersey	216
Delaware	14
Maryland	93
District of Columbia	109
West Virginia	27
Virginia	66
Total	3,758

SESSIONAL PAPER No. 25

STATEMENT of persons registered at Chateau Lake Louise, Lake Louise, Alta., season 1916.—*Continued.*

Kentucky	69
Tennessee	75
North Carolina	11
South Carolina	9
Georgia	59
Alabama	27
Mississippi	11
Louisiana	43
Florida	27
Total	331
Ohio	284
(Cleveland)	156
(Cincinnati)	102
Michigan	151
(Detroit)	124
Indiana	141
(Indianapolis)	61
Illinois	346
(Chicago)	801
Iowa	249
Total	2,415
Missouri	50
(St. Louis)	32
Kansas	54
(Kansas City)	64
Arkansas	14
Oklahoma	24
Nebraska	83
(Omaha)	27
Texas	87
Total	435
Wisconsin	128
(Milwaukee)	101
Minnesota	125
(Minneapolis)	356
St. Paul	98
North Dakota	30
South Dakota	19
Total	857
Washington	340
Oregon	184
California	504
(San Francisco)	281
(Los Angeles)	409
Nevada	3
Total	1,721

Montana	15
Idaho	8
Colorado	19
Utah	8
Arizona	9
Total	59
West Indies	19
Mexico and Central America	3
South America	8
Total	30
England	66
Scotland	12
France	13
Italy	2
Switzerland	2
Holland	7
Other European countries	3
Total	105
Australia	102
New Zealand	34
China	55
India	15
Hawaii	38
Philippine Islands	29
Africa	6
Japan	20
Straits Settlements	13
Total	303

Conducted Parties (otherwise unlocated).

Raymond and Whitcomb	37
Thos. Cook & Son	24
G. K. & B.	78
Various	61
Total	200
Unlocated	64
Total, 1915	27,716
Total, 1916	11,966
Decrease	15,750

GUESTS registered at the King Edward hotel, from April 1, 1916, to March 31, 1917.

Canada	5,214
America	807
Australia	26
England	31
China	17
Japan	9
Scotland	14
Holland	4
Mexico	1
Java	1
Honolulu	3
New Zealand	11
Wales	16
France	2
Total	6,156

Hot Springs Hotel.

Alberta	221	Quebec	3
Saskatchewan	198	Ontario	12
Manitoba	44		
British Columbia	13	Total	504
United States	12		
Nova Scotia	1		

Mount Royal Hotel, from April 15, 1916, to September 10, 1916.

Canada	1,893	Cuba	1
United States	542	China	2
England	14	Carnival visitors, February 7-16, 1917	202
Scotland	5		
Australia	10	Total	2,678
New Zealand	5		
India	4		

Alberta Hotel (Open year round).

Canada	3,608	Tasmania	4
United States	590	Scotland	6
Australia	19		
New Zealand	3	Total	4,240
England	10		

Sanatorium Hotel (Closed early in fall):

England	150	Ireland	6
Australia	25	Scotland	16
Canada	1.850		
United States	2,007	Total	4,082
Japan	10		
New Zealand	18		

Homestead Hotel, Banff, from March 31, 1916, to March 31, 1917.

Canada	2,272	Egypt	2
United States	703	Australia	8
Great Britain	7		
China	4	Total	3,000
India	4		

SESSIONAL PAPER No. 25

Special Parties Which Visited Banff and Lake Louise, 1916.

Date.	Name of Party.	——
May 25..	Thos. P. Cope and party	
" 29.	N. P. C. P. A. Meeting, Banff	Extra car.
June 6..	Empire Parliamentary party	Private car.
" 8..	Can. Credit Men's Trust Association	Two cars.
" 9..	Midnight Sun Tour "O"	
" 9..	R. & W. Alaska Tours 91 and 92	
" 10..	" " 92	
" 10..	W. A. Franklin and party	
" 19..	R. & W. Tour 71	
" 28..	Dr. Davies and party	
" 30..	Grand Encampment—Knights Templar	Special train.
July 1..	Grand Commandery—Mass. and R.. I. K. T	"
" 1..	Jos. Warren Commandery K.T	"
" 1..	The Weyer party	"
" 2..	Duke and Duchess of Connaught and party	"
" 3..	R. & W. Tour 81	
" 5..	Nutter party	Extra car.
" 5..	33rd Triennial conclave, K. T	Special train.
" 6..	R. & W. Tour, 107	
" 7..	C. B. Ford and party	
" 8..	Edward H. Lows, Alaska Tour, 1916	
" 8..	Boyd Tour No. 75	
" 9..	G. K. & B. Tour "E"	Extra car.
" 9..	G. K. & B. Tour "S"	"
" 10..	Frank Tourist party	
" 14..	J. S. Wallace party	
" 16..	G. K. & B. Tour "Y"	"
" 16..	R. & W. Tour 74	
" 18..	G. K. & B. Tour "C"	
" 19..	Thos. Cook & Son's party—Alaska	"
" 20..	R. & W. Tour 114	"
" 24..	Prof. Fisher party	
" 26 .	Akers, Folkman & Lawrence party	"
" 27..	Washington, D.C., Delg. K. P	
" 28..	Miss Pantlind party	
" 29..	Pythian Sisters	"
" 29..	E C. Atkinson and party	
" 31..	Eager party	
Aug. 2..	G. K. & B. Tour "G"	
" 6..	Ohio Bankers' Tour, 1916	3 Pullmans.
" 6..	Geo. W. Norton party	
" 9..	Miss R. M. Rhodes party	2 extra cars.
" 11..	Mrs. R. M. Rhodes party	
" 11..	Dr. J. C. Boyd and family	
" 12..	Alexander party	
" 14..	Miss Iselin party	
" 15..	Violette party (Miss Fairbanks)	Extra car.
" 16..	McIlvray & Foote party	
" 15..	Gray party	
" 15..	R. & W. Tours 164, 168 and 196	
" 21 .	Penna. Co. Tour	Special train.
" 22..	R. & W. Tour 102	Extra car.
" 27..	Union Bank officials	Special train.
.....	McKay-Edgar	"
" 30..	Wicker party	Extra car.
" 31..	Grand Theatre party	"
" 31..	Prosser party	Private car.
Sept. 6..	G. K. & B. Tour "E"	

Special Trips.

May	24th—Calgary War Veteran's Association	200
	29th—Alberta Grand Lodge Free Masons (3 days)	300
	30th—Canadian Passenger Agents	12
July	1st—No special parties but large numbers in town	300
	3rd—Knights of Pythias	250
	Benchers Alberta Law Society (3 days)	20
	4th—Large conducted party from United States	250
	14th—Indian Day Sports	500
	15th—Calgary War Veteran's Association	250
	19th—Strathmore Sabbath School	400
	26th—Red Deer and Carstairs Methodist Church	850
August	2nd—Canadian Ordnance Corps, Banff	150
	High River Sunday School	350
	9th—Calgary Anglican Church	500
		4,332

Summary.

Banff Spring Hotel	10,624
Chateau Lake Louise	11,966
Sanatorium	4,082
King Edward Hotel	6,156
Hot Springs Hydropathic Hotel	504
Mount Royal Hotel	2,678
Alberta Hotel	4,240
Homestead Hotel	3,000
Summer cottagers and campers	7,000
Excursionists—estimated	6,000
Special parties—estimated	1,000
Total	57,250

APPENDIX 2d.

ANALYSIS OF HOT SULPHUR WATERS, BANFF.

Through the courtesy of the Department of Mines, an examination of the waters of the hot sulphur springs, at Banff, with special regard to their radioactive properties, was made during the year by R. T. Elworthy, B.Sc., assistant chemist of that department. Mr. Elworthy spent some time at Banff and has submitted a very comprehensive report which is to be published in monograph form. A few extracts are given below:—

"Several tests were made on each of the springs at Banff, in December, 1916, for the radium emanation content or temporary activity, and during the winter at Ottawa on the radium content, or permanent activity.

"The radium present as dissolved radium in the water and the radium emanation in the water and in the gases which are evolved from the springs was measured and the results were found as follows:—

Spring.	Temperature.		Rate of Flow.	Water.		Gas
				Radium Emanation.	Radium.	Radium. Emanation.
	C°	F°	gals. per hr.	units.	units.	units.
Upper Hot	45·0	115	8,000	221	8·6	–
Kidney	39·0	101·5	1,200	392	8·5	–
Middle	33·5	92	6,000	294	8·6	1910
Cave	29·5	85	15,000	470	8·5	3340
Basin	34·5	94	10,000	232	8·5	2370
Auto Road	19·4	67	6,000	640	23·5	–
Alpine Club	6·6	44	3,000	475	–	–

"But such figures are of little interest by themselves. It is important to know how the activity of these springs compares with that of other springs notable for their radioactivity or therapeutic value.

"In the United States, several of the chief groups of springs have been the subject of investigation; probably those of greatest interest for comparison with Banff are the Yellowstone Park waters. There are three groups of waters rising in the Yellowstone Park district, and the Banff waters most nearly correspond to those springs which contain predominant amounts of calcium carbonate and calcium sulphate. The Mammoth Hot Springs are a typical example of this group.

"Comparing the radioactivity of the gases evolved from both groups of springs it is seen that the Banff gases are of considerably higher radioactive value. The radioactivity of the waters varies from 1,600 units per litre to negative results but the average value corresponds very closely with the Banff waters.

	Temperature.		Radioactivity of Gas.	Radioactivity of Water.
	C°.	F°.		
Mammoth Hot Springs—				
Hot River	51	123·8	.....	1610
Cleopatra	71	160	none	none
Hymen	71	160	none	trace
Squirrel	32	89	2850	70
Soda	15·5	60	570	122
Banff Springs—				
Upper Hot	46	115	.....	221
Cave	29·5	85	3340	470
Basin	34·5	94	2370	232
Middle	33·5	92	1910	294

"The waters are not so strongly radioactive as the famous Bath springs in England which were the subject of examination by the late Sir William Ramsay, although they closely resemble them in other respects.

THE RESEMBLANCE BETWEEN THE BANFF AND THE BATH HOT SPRINGS.

"The most interesting comparison is to be made between the Banff waters and the hot springs at Bath in England, the famous spa that dates its foundation from the Roman occupation of Britain.

"In recent years the springs have been the subject of examination by several prominent scientists, especially by the late Sir William Ramsay, who directed attention to their radioactive properties, and to their value on that account. They were shown to be the richest in radium and radium emanation of any spring in Great Britain, and no expense has been spared in developing the springs to the fullest extent that they might successfully compete with the continental spas.

"There are three springs at Bath, all of similar composition. The temperature of the hottest is 120° F., just slightly higher than that of the Upper Hot spring at Banff. A comparison of the constituents of the waters reveals the similarity between the springs, the chief substances present in both waters being calcium salts. Slightly more sodium and iron exist in the Bath waters, and the concentration of all the constituents is a little greater than in all the Banff waters save the Basin spring.

"The gases evolved from the Bath springs have been investigated by Prof. Sir James Dewar, who demonstrated the presence of helium, argon, krypton, and zenon, the rare gases of the atmosphere in them, and later by Sir William Ramsay, who showed their high radioactivity. The composition of the Banff gases is almost identical. Therefore all that applies to the thermal waters of Bath is equally true of the Banff waters. The complete analysis of the gases from the Basin, the Cave and the middle springs is given below together with an analysis of the gas from the Kings Well, Bath, England.

——	Middle.	Cave.	Basin.	Kings Well Bath.
	%	%	%	%
Methane	0·15	0·11	0·19	.....
Hydrogen	0·07	0·09	0·04	.....
Oxygen	0·81	0·45	0·50	.....
Carbon dioxide	1·18	1·11	1·34	3·60
Nitrogen	97·79	98·24	96·68	95·45
Argon and Helium			1·25	0·95

SESSIONAL PAPER No. 25

APPENDIX No. 3.

REPORT OF THE SUPERINTENDENT OF YOHO AND GLACIER PARKS.

YOHO PARK.

Following along the lines of the policy laid down by the department, nearly all work undertaken this year was either maintenance or repairs, practically all new construction work being set aside until the termination of the war in which the country is at present engaged, the only exception to this policy in Yoho park being in the case of alien labour, which was employed in the construction of a new piece of road, which when completed will connect the Ottertail road with the Natural-Bridge road, and thus make a most attractive circular drive from Field.

Tourist traffic last season started out with every indication of fully equalling, if not exceeding, that of the previous season, which was probably the largest on record, and these expectations would most probably have been realized had it not been for the threatened railway strike in the United States at the end of August, which, owing to the uncertainty of travel, caused thousands of bookings to be cancelled, and the tourist travel gradually fell away from that time on to the end of the season. The majority of our visitors this year were from the United States, and the general tendency seemed to be for them to spend a longer period of time at the different points of interest than heretofore.

In the month of July we were honoured by a visit from Their Royal Highnesses the Duke and Duchess of Connaught and party, who made the drive up the celebrated Yoho road to Takakkaw falls.

Dr. C. D. Walcott, of the Smithsonian Institute, Washington, spent some six weeks in the park, accompanied by Mrs. Walcott, and during the course of their stay discovered a new fossil bed in the vicinity of Hector, which may prove of great geological value.

Mr. Sargent, the celebrated landscape painter, was also amongst our visitors, and spent some weeks in the park painting, both up the Yoho valley and also at lake O'Hara. Other distinguished visitors included the Minister of the Interior and the Premier of British Columbia.

In the spring of the year the first work undertaken was the usual cleaning up around and in the townsite of Field, when such streets as required it were gravelled, ditches cleaned out, sidewalks and culverts repaired, etc. A wire fence was erected around the Government lot on which the superintendent's house stands, and a Page wire fence was also put up enclosing the cemetery grounds. The road to the nuisance ground was gone over and ditched, in order to carry off the water and make it passable in the early spring, and thus facilitate the carrying away of the town garbage as soon as possible.

Due to the lateness of the season, it was about the middle of May before the snow was sufficiently melted to enable us to open up our roads for the summer travel. On the Emerald lake road two sectionmen were placed, who remained on this road for about four months and were able to keep the road up to its usual standard of excellence, the distance being seven miles.

On the Ottertail and Yoho roads a considerable amount of repair work was done, and both roads were put in good condition. During the month of June we were unfortunate in having a very severe flood, caused by a cloud burst, following three excessively hot days, which caused nearly every creek and river to rise very rapidly, and in a number of cases to overflow or burst their banks. Large quantities of sand

and gravel were brought down from the mountains, bridges were undermined, and in some cases were completely washed away, thus causing a lot of extra repair work on nearly every road and trail in the park. The bridge over the Kicking Horse river at Leanchoil, which was a very old one, was nearly all carried away, and the bridge on the road to the cemetery at the back of the Field townsite was completely taken out, and the approaches to a number of other bridges were also damaged.

The road gang successfully repaired all this damage on the Yoho road, as well as all other repairs of a heavy nature, after which two sectionmen were also placed on this road, who did all necessary repairs during the balance of the season.

Roads in Yoho Park,	Approximate Mileage.
Yoho road	11 miles.
Emerald Lake road	7 "
Emerald Lake via Natural bridge—extra mileage	2 "
Hector road	5 "
Ottertail road	6½ "
Total	31½ "

During the month of July a small trail gang was started out to do necessary repairs on the Ice river, Beaverfoot, Leanchoil, and a section of the Ottertail trails. Most of this work also was rendered necessary by the floods during June, which in one or two instances had washed away whole sections of trail in places where the trail followed closely to the river bank. In these places new trail was constructed on higher ground wherever possible. We now have considerably over 100 miles of good trails in the Yoho park, the principal trails being:—

		Approximate Mileage.
No. 1.	Beaverfoot trail	14 miles.
No. 2.	Ice River trail	6 "
No. 3.	Leanchoil trail	12 "
No. 4.	Deer Lodge trail	2½ "
No. 5.	Ottertail trail	12 "
No. 6.	McArthur Creek trail	10 "
No. 7.	Lake O'Hara trail	9 "
No. 8.	Stephen trail	3 "
No. 9.	Sherbrooke trail	4 "
No. 10.	Twin Falls trail	7 "
No. 11.	Yoho Glacier trail	4 "
No. 12.	Whaleback trail	2½ "
No. 13.	Little Yoho trail (return)	14 "
No. 14.	Upper Twin Falls trail	12 "
No. 15.	Burgess Pass trail	7 "
No. 16.	Summit Lake trail	4 "
No. 17.	Fossil Bed trail	3 "
No. 18.	Amiskwi trail	18 "
No. 19.	Kicking Horse trail	12 "
No. 20.	Emerald trail	3 "
No. 21.	Otterhead trail	3 "
No. 22.	Wapta Falls trail	4 "
Total		166 "

These trails are all patrolled by our staff of wardens, and during the summer months, outside of some special repairs, are cleaned out and kept in condition by them. I am pleased to be able to report that we did not have to make any expenditure this year in any park under my direction on account of forest fires except the salaries of the wardens, who also accomplished quite a lot of other work in addition to their patrol duties. This was particularly gratifying at such a time as this when expenditure for such a purpose could so ill be spared and can be largely attributed, I consider, to the entire absence of the hobo element tramping through the park on the right-of-way, which in past years was one of our principal sources of danger, due to the careless

manner in which they left their camp fires. Another link in our fire protection scheme was completed this year, viz.: the completion of a telephone line from the superintendent's office at Field to the warden's cabin at Takakkaw falls, a distance of eleven miles following the Yoho road. This I hope will prove to be the beginning of a system which will ultimately connect up all parts of the park with the central office, thereby facilitating the speedy reporting of all fires, and making it possible to get assistance on the ground before the fire has got too firm a hold, as well as being of the utmost assistance to the superintendent, in enabling him to keep in touch with all work going on in the park under his direction.

An addition was made this year to our wardens' equipment by the purchase of three serviceable ponies.

At the internment camp for alien enemies, which was installed in the park near the mouth of the Otterhead river late in the fall of 1915, very good results were obtained during the first part of the season. The right-of-way was cleared along the new Ottertail-Natural bridge road, from a point near the Ottertail high bridge on the old grade to the new crossing over the Kicking Horse river, a distance of four miles. This piece was also grubbed and burned by them.

Two large truss bridges were constructed, one over the Kicking Horse river, total length 200 feet, and one over the Ottertail river, total length 112½ feet, both of which were erected in a most creditable manner, as was also a smaller bridge over Boulder creek.

In November we commenced the erection of a new tool-house and wagon-shed which we were badly in need of. The building is a two-storey log building 24 feet by 30 feet inside measurement, and will be able to meet our requirements in this way for some years to come.

GLACIER PARK.

In this park it was the 1st of June before I was able to take any steps towards opening up the various roads and trails for the summer's traffic. The mantle of snow covering the ground had been heavier than usual the previous winter, and when it is stated that the average snowfall for the last ten years is 38 feet at Glacier station, it will be readily understood that considerable sunshine is required before the earth makes its appearance again.

Three wardens were placed on duty on June 1. They at once started to clean out the trails in their different districts, and about the middle of the month two sectionmen were placed on the road to the Nakimu caves to clear out the numerous snow and mud slides with which it was blocked.

On June 14, Mr. C. H. Deutschmann, the discoverer of the Nakimu caves, who is employed by the department as caretaker, opened them for the season, and at once began the construction of an entrance into the lower and larger caves, which have heretofore been almost inaccessible, but of which a survey had been made by Mr. C. D. Finnie, Inspecting Engineer of Mines for the Department of the Interior.

A tunnel was driven in for a distance of 25 feet, when a good connection was effected. This entrance was protected by a shed, roofed with corrugated, galvanized iron, which is to serve the double purpose of protecting the entrance from falling rocks and snow, and also as a workshop in connection with the work which we hope to do this year, as before the general public can be allowed in this part of the caves with safety certain protection work will have to be done in the way of erecting hand rails, stepladders, ets. From the new entrance a good trail was also constructed to connect with the main trail leading to the upper caves, a distance of about 1,600 feet.

Great credit is due to Mr. Deutschmann for the able manner in which this work was carried out, and which was completed at a cost considerably under the engineer's estimate.

The new Connaught tunnel under mount Macdonald was officially opened by His Royal Highness the Duke of Connaught in July, when the royal party were taken through the tunnel in a car drawn by a compressed air engine; and on January 8 the tunnel was opened for general use to the public, since when the old line over Roger's pass has been abandoned. The tunnel just completed is the longest on the North American continent, being slightly over five miles in length, the whole distance being double tracked. It eliminates about four miles of snow sheds and reduces the grade by a considerable amount, besides cutting down the distance over the summit of the Selkirk range by about four miles.

A new depot is now under construction at the western end of the tunnel. It is a log building, and will be quite in keeping with the local surroundings. A wagon road has also been constructed from the new depot to a point on the old railroad grade, to connect with the Glacier hotel, which will now be about one mile and a quarter from the station.

At the east portal of the tunnel the work of cleaning up the townsite leased by the railway company from this department is almost completed, but owing to the late date at which the townsite at the western end was vacated, the cleaning up of this area cannot be done until the snow has melted.

The Dominion Parks inspectors who have been resident at these townsites for the purpose of protecting the parks interests were relieved of their duties at the end of January, when both townsites were vacated by the contractors, the supervision of the cleaning up being left to Glacier Park Inspector Williamson.

E. N. RUSSELL.

Approximate Mileage of Trails and Roads in Glacier Park.

No. 1.	Nakimu Caves trail	1½	miles
No. 2.	Great Glacier trail (return)	4	"
No. 3.	Sir Donald trail	3	"
No. 4.	Asulkan trail	6	"
No. 5.	Mount Abbott trail	6	"
No. 6.	Lookout trail	5½	"
No. 7.	Rogers Pass trail	4	"
No. 8.	Baloo Pass trail	5	"
No. 9.	Beaver River trail	15	"
No. 10.	Flat Creek trail	17	"
No. 11.	Illecillewaet trail	7	"
No. 12.	Caribou trail	2	"
	Total	76½	"
Nakimu Caves road		7	"

APPENDIX No. 4.

REPORT OF THE ACTING SUPERINTENDENT OF REVELSTOKE PARK.

Due to the enlistment of Superintendent F. E. Maunder in the Canadian Expeditionary Force, at the end of the last fiscal year I was instructed by the commissioner to take over the management of this park for the time being, in addition to my regular duties as superintendent of the Yoho and Glacier Parks, and in order that I might be able to handle this extra amount of work, an office clerk was supplied to assist me with these extra duties.

As soon as possible I, therefore, went to Revelstoke to take up a number of details in connection with the season's work. In company with the foreman I inspected the motor road as far as completed, and we decided on what repairs it was necessary to make; these were mostly in the way of cleaning out the side ditches which had become clogged, and removing rock or mud slides which had come down over the road. The books, files and papers relating to the park I had packed up and sent to my office at Field, from which I have since handled the park's affairs. Before leaving I also instructed the foreman to have a complete inventory taken of all equipment and material belonging to the park. This inventory was completed in a few days, and from it I was able to see that our requirements in the way of new tools would be very small, the principal outlay that would be necessary in this way being for dynamite, of which a considerable quantity would be needed, owing to the heavy percentage of rock work on the next few miles of the motor road on which it proposed to continue construction.

On June 13, foreman Wm. Fleming started with a gang of about thirty men to repair the portion of the road already built. Camp was pitched at the site of the old internment camp, at which place it remained until the closing down of the work in October. This was more a matter of necessity than choice, and towards the latter part of the season it made quite a long walk for the men to and from their work, but was quite unavoidable on account of their being no possible camping ground higher up where water was obtainable. The country is mostly of a rugged nature, with steep sidehills, and camping grounds, that are suitable, are therefore somewhat scarce. It was not necessary, however, for the men to have to walk all this distance by the road as on account of its winding nature, they were able to cut through the bush by trail and thus save going around by the switchbacks.

At the site of the old internment camp it was necessary to spend quite a little time cleaning up. The military authorities had vacated this camp during mid winter, when the depth of snow on the ground rendered any attempt at cleaning up almost futile. All buildings were swept out, rubbish was all collected, and either burned or buried, and the camp generally given a more neat appearance. This work and all repairs on the road up to station 427 were completed by the end of the month.

From station 427 on to station 500, had been partially completed by alien labour the season before, but practically all the solid rock work remained to be done as well as the ditching and finishing, but by the end of July this section was fully completed and provision was made for a turning point for motor cars at McDonald's bluff which is situated almost at station 500.

From here on the grading was steadily pushed ahead and by the end of October when work for the season closed down, the road was fully completed to within a few yards of Bridge creek, which is at Station 578.

The latter portion of the work was probably some of the heaviest on the whole road particularly near Bridge creek where it was necessary to move a large amount of solid rock but all the work done should be of a fairly permanent kind owing to the nature of the soil which is a sort of cemented gravel intermixed with solid rock and, when once well packed down, forms a road bed that will not easily wear or wash away.

Toward the latter portion of the season we experienced considerable trouble in getting sufficient men, and we were not able to keep our force of men up to the number I should have liked; this of course was largely due to enlistments. Revelstoke and the surrounding district have given to the country of their best, with the result that labour for home work is naturally very scarce, and that which is obtainable is probably a little below the average in efficiency, compared with other years.

On July 28, the Governor General and suite while on their way east, stopped off at Revelstoke for a few hours, and during this time a trip was arranged for the Royal party by the Revelstoke Board of Trade. The route chosen was via the motor road in the park, up mount Revelstoke. Motor cars were waiting at the station and on the arrival of the special train, after a few introductions, the party started up the hill which in honour of the occasion was patrolled by the boy scouts of Revelstoke, who were stationed every hundred yards or so throughout its entire length.

The cars all drove direct to the end of the road, as far as it was at that time completed, which at that time was station 500, or McDonald's bluff. At this point the party alighted, and the Duke kindly consented to plant a post with a suitable inscription on it, in commemoration of his visit. It was explained that this post was to be later superseded by a more permanent structure. On the completion of this short ceremony, the party again took their seats in the cars and were driven to the road camp, where they were met by our foreman and time-keeper, who invited the party to partake of afternoon tea which had been prepared for them. A pleasant half-hour was spent in this way, when the cars again conveyed everyone to the railway station, and shortly afterwards the Royal special resumed its journey east. The picking out of this drive by the people of Revelstoke on this occasion demonstrates clearly the manner in which they appreciate the development work which this department is undertaking in the Revelstoke park. There are a number of beautiful scenic drives around Revelstoke, but of them all the one we have under construction in the park is conceded to have no equal, and I trust that by the end of next year we may have this road finished to the top of the mountain, which will open up a large country the possibilities of which for public recreation are enormous.

From figures obtained from the various livery interests in Revelstoke, it is estimated that about 300 persons went up this road in hired cars during last summer, a number probably greater than this went up in local private cars, in addition to those who walked up of whom there were quite a few.

The question of the extension of the southern boundary of the park was taken up, as it was considered advisable for the park area to come as close as possible to the townsite of Revelstoke, and also for it to include all of the road up the mountain. Both the Chief Superintendent and myself went into the matter fully with the Board of Trade and the city council, both of which bodies were strongly in favour of such an extension, and pledged themselves to assist the department in every way possible. Definite recommendations were made along these lines by the chief superintendent in his report, the area agreed upon to be included, taking in all Crown land lying between the present south boundary of the park and the city limits. Unfortunately there are several homesteads which have been taken up near the city, which prevent us extending the park boundary to adjoin the city, but of these several of the owners have made application to have their land included in the park. I trust that this question will be settled at an early date in order to facilitate the enforcement of the park regulations.

Winter sports in Revelstoke are now becoming an annual event, and under the able management of the Revelstoke Ski Club, attracted more attention, and were a big-

ger success than ever this year. The Club grounds, which lie immediately adjacent to the park boundary, possess, I believe, one of the finest Ski jumps in the world, and at the annual carnival this year, both the champion ski jumper of the world, and also the amateur champion of Canada were competitors in their numerous events. Large crowds came to see the carnival, which lasted for two days. The weather unfortunately was rather too soft for good jumping, but even with these conditions a jump of 160 feet was made, which is eleven feet further than the previous longest jump made by any amateur in Canada. The club, realizing the advantages and possibilities of the park, are, I understand, seriously considering making an application to have their ground included within the new extension to the park.

In conclusion I would like to thank the citizens of Revelstoke for the courtesy and assistance which they have at all times been so willing to render to me while temporarily discharging the duties of superintendent of this park.

E. N. RUSSELL.

APPENDIX No. 5.

REPORT OF THE SUPERINTENDENT OF WATERTON LAKES PARK.

I am very glad to be able to report a very successful year in this park, both as regards the increase in the number of visitors and the development work undertaken. In the face of the absolute necessity of practising the strictest economy as regards all expenditure during the war, I consider the amount and nature of work allowed and accomplished during the year very satisfactory.

The weather last season was very good, and this, together with the improved condition of the roads and the natural attractions of the park, which are becoming more widely known, accounts for the gratifying increase in the number of visitors and the greater interest shown in the park, which is being more widely recognized as an unequalled place in which to spend a most interesting and enjoyable vacation.

I regret to have to report the death of two of our wardens, viz., John George Brown, and Lieut. George Knight.

John George Brown, more commonly known as "Kootenai" Brown, died on July 18, after a short illness, at his home in the park. The late Mr. Brown was the first settler in this locality. He was the first ranger in charge of the park, and, in fact, the existence of the park is largely due to his efforts to have protection afforded the game, as he realized that with the number of settlers in the country increasing its destruction was certain.

Lieut. George Knight was killed in action in France last summer. Up to the time of his enlistment he was engaged in the park as fire and game warden. He was very popular with every one and most faithful in the discharge of his duties.

ROADS.

With the exception of a short distance from the east boundary of the park to Crooked creek, no new roads were constructed during the year; along this route a new grade was built. This grade connects with a turnpike road graded last summer by the provincial government from Cardston to the park, and, owing to its construction, where it was formerly practically impossible to travel in wet weather, the automobiles can now come to the park from Lethbridge, Macleod, Cardston, and other eastern points. There is still some grading to be done on the road after it enters the park, but the work already accomplished has improved it to a large extent, and I hope to be able to complete the remaining part in the coming year. We should then have a first-class automobile road through the park from the east. All that portion of the road from Crooked creek to the resort, not graded, was gone over and put in as good condition as possible without incurring too much expense.

The wagon road up Pass creek and over the Summit to Oil City was cleared of stumps and rocks, and in some places diverted to lessen the grade. Where some slides had occurred a new roadbed was built, and this road is now in good shape, although a bridge over Pass creek is urgently required. This road leads into one of the most beautiful valleys of the park, and is very popular with tourists as a camping place and means of access to lake Bertha and other lakes which provide good fishing.

Although the road mentioned above is now passable and in fair shape, by following the route it does it has to cross the summit, and naturally the grades are very steep in some places. A more direct and level road could be put in from the resort

to this part of the park by following up Oil creek. This would shorten the distance about seven miles and make a much better road to travel over.

The main road from the north, which connects with the road from Pincher creek, was raked and picked over to the park line, a distance of about 7 miles. This work was badly needed and made a great improvement to the road.

The road leading from Lot 10, in Block 7, to Lot 1, in Block 3, in the townsite, along the base of the mountain was also gone over, rocks picked out, raked, and the grade cut down in places. This is a beautiful stretch of road through the trees and all it now requires is widening in places where there are sharp turns in order thereby to lessen the danger of accidents.

TRAILS.

A good deal of work was undertaken in connection with the extension of some of our trails and the construction of others.

A new trail was built up Stoney creek and through the Crooked creek basin to Belly River station, a distance of about 7 miles. This trail is partly through heavy timber and partly open country and now allows one to take a direct route from the lakes to this point, a saving of some 6 or 7 miles over the old route.

The trail from Cottonwood creek through the Horseshoe and over the summit to Yarrow Creek station was completed, a distance of 8 miles beyond where the trail was built the year before. The section of the country through which this trail leads was formerly impassable. It also makes a direct route from headquarters to the Yarrow station, a saving of many miles over the old route around Pine ridge.

Some work was done on the Boundary trail such as clearing, etc. Further work is necessary on this trail on account of its being used to a greater extent each year as the number of tourists from the Glacier National park to the south of us increases.

The trail to Oil City, which follows up Oil creek, was cleared and widened and some grading done.

Some work was also performed on the trail leading from the Belly river cabin to the United States boundary.

The last three mentioned trails are constantly in use during the summer and it is therefore necessary that they be kept in good shape.

PARK BUILDINGS.

A new cabin was erected at the Waterton bridge for the use of the warden stationed at this point. This cabin is located at a very important point, at the end of the above bridge where everyone coming from the east must enter the park. The building is of upright poles and cottage roof and when fenced, etc., will be very attractive.

A blacksmith shop and granary were also erected at the headquarters. Both these buildings have filled a longfelt want in the park.

Bridges.

The old bridge across Cameron creek below the falls was washed out early in the spring and a new bridge built along firmer and more attractive lines.

A small bridge was built over Crooked creek where the new graded road crosses.

Some work was done on the bridge over the Waterton river in order to strengthen the same.

OTHER DEVELOPMENT WORK.

Some two and one-half miles of first-class fence was erected. This fence encloses a large area of good grazing land where it is proposed to have the tourists and visitors keep their horses while camping or visiting the park. Heretofore the absence of such provision has been the cause of considerable inconvenience and I am sure it will be greatly appreciated.

Twenty acres of land were broken and oats and timothy planted but owing to its being so late before the crop was put in, it was not a success. A larger area will be seeded this year and earlier. The raising of our own feed will mean a large saving to the department.

FIRE AND GAME PROTECTION.

Big game of all kinds is very numerous in the parks. Considerable trouble has been experienced during the past winter with wolves and coyotes which have been a serious menace, particularly to the deer. Strenuous steps are to be taken forthwith to cope with this pest. Bears, which are rapidly increasing in numbers and becoming more of a nuisance, caused some trouble last fall. Owing to the continued protection, the deer especially are coming lower down and early in the season may quite often be seen around the buildings and in large numbers.

There were two infringements of the park regulations governing the killing of deer. Convictions were secured in both instances. Some other minor infringements of the regulations were reported and convictions secured in each case.

I am very glad to report that no damage whatever was done by fire in the park during the year. One small fire was discovered on the open prairie and extinguished by one of the wardens before it had gone any distance.

RECREATION.

In addition to the different means of outdoor recreation here, such as boating, fishing, riding, etc., we completed last summer two tennis courts and a baseball ground for the use of the public. The tennis courts were not completed in time to be of use but the baseball ground was taken advantage of and evidently appreciated, some very spirited games having been played.

The fishing is all that can be desired, not only in the different creeks and smaller lakes, but the big lake trout are very plentiful in the main lakes and some excellent catches were made.

Quite a number of parties enjoyed exciting climbs to the summits of some of the rugged and picturesque peaks in the park. One party after two days climbing, succeeded in attaining the summit of mount Cleveland to the south, the altitude of which is 10,500 feet.

Large numbers of tourists spent a few days in the park travelling through from the Glacier National park and one and all were loud in their praises of the beauties of the Waterton Lakes park.

Work has been commenced on a number of summer cottages and many inquiries received with regard to lots both for residential and business purposes. Quite a large number of the lots in the townsite were disposed of and the plans of the proposed buildings thereon are of a good type, mostly of a rustic nature so as to conform to the surroundings.

Along the boulevards the undergrowth and stumps were all cleared and the property made much more attractive. A number of rustic seats were built along the shore of the bay.

We had a considerable increase over former years in the number of visitors, over 4,000 coming to the park last season. As we are some 35 miles from a railroad and the season is quite short, I think this is an excellent showing and proves that this park will become famous as a summer resort and each year will see greater numbers of people taking advantage of its different attractions.

ROBERT COOPER.

APPENDIX No. 6.

REPORT OF THE ACTING SUPERINTENDENT OF JASPER PARK.

The outstanding improvement being carried on in Jasper park this year is the construction of a 14-mile carriage drive to mount Edith Cavell, a beautiful snow-clad mountain about 11,000 feet high chosen to commemorate the martyrdom of the noble nurse executed by the Germans in Belgium. This striking peak, notwithstanding its beauty, had remained unnamed, awaiting, it would seem, the honour that was to fall upon it.

The drive to this mountain will be a source of pleasure to all who pass over it. Starting from Jasper, it crosses the Miette river at a distance of a mile, where the latter joins the Athabaska. For some distance it follows the western bank of the Athabaska, taking in all its sinuosities and affording a number of strikingly beautiful views of riverscape and surrounding mountains. Four mountain streams are crossed on the way. As the road winds up the steep hillside to the foot of the mountain and unexpectedly reveals the beautiful jade-coloured lake at its base, one realizes the special delights reserved here for those fortunate enough to visit the district. The bridges on this drive span the Miette, Whistler, Boulder, and Cavell rivers, and are respectively 100 feet, 40 feet, 300 feet, and 60 feet long; the last spanning a canyon some 50 feet deep. These bridges are all constructed of timber taken on the ground, and are of a rustic design suitable to the surroundings.

Following out the policy of the department, a chalet will be built at the foot of mount Edith Cavell on completion of the drive, probably some time next summer, which will give visitors an opportunity of remaining there a few days exploring the many singular features in that vicinity, and the abundant growth of mountain flowers, masses of red and white heather, forget-me-nots, moss campion and Indian paintbrush in every shade from bronze to crimson.

SULPHUR SPRINGS.

Notwithstanding that the vicinity of the Miette Sulphur Springs has not yet been put in shape for those wishing to avail themselves of its curative waters, more than forty people were camped there at one time during the past summer, putting up with the hardships for the sake of the benefit to be derived.

FISHING.

Fishing is a feature of interest to nearly all visitors. Any true sportsman who visited this park last season and participated in this sport had no cause for complaint. The deeper lakes like Pyramid, Jack and others furnished their quota of 2-, 3- and 4-pound lake trout. The smaller streams and shallow lakes did well in the way of providing a good supply of that gamey little fighter, the rainbow trout, and the rivers, when they had become clear, a number of the Dolly Varden trout.

GAME.

It is a noticeable fact that the game animals are becoming quite tame in this park, and the beaver so plentiful that rabid utilitarians speak of them as a nuisance not recognizing the pleasure the sight of these little animals at work gives to those who have never seen beavers and considered them extinct.

Mountain sheep are to be seen from the train, and herds of deer gaze timidly at one when driving within a few miles of Jasper.

VISITORS.

Visitors to the park during the past year were for the most part from the large cities of Canada and the United States, and considering the unsettled weather and the great drawback of not having an hotel, were fairly numerous and well satisfied with their visit.

It is greatly to be regretted, however, that the anticipated erection of the hotel has not as yet materialized, due no doubt, to the strain of the war. The present hotel situation, however, is being looked after by the "Tented City" conducted under the auspices of the Grand Trunk Pacific railway, at a point on the shores of Lac Beau Vert, a beautiful spot much appreciated by lovers of nature, where the tourist can boat, fish, ride, drive and climb. The tourist of means demands his well appointed hotel and it is to be hoped that ere long the erection of one which will meet the needs of this class of visitor may be possible.

HUNTING.

Many hunting parties were outfitted in Jasper during the early spring and late fall of last year for hunting trips outside the park, and returned well satisfied with the trophies secured, including mountain sheep and goat-heads, grizzly-bear skins, etc., and the resident guides have already been retained for further trips this coming spring.

FIRES.

Owing to the care exercised and assisted by a wet summer, only a few fires occurred. They were of an incipient character and easily put out. These fires, however, were all started by coal burning locomotives, and our good fortune of last year does not convey any security for the future, or guarantee that a disastrous fire may not occur at any time. If the railways could be compelled to use only oil as fuel for their locomotives this danger would be greatly diminished.

TELEPHONES.

The telephone system is a feature of this park, giving much greater results than its outlay would indicate. An addition of thirty miles has been built during the past season, and the service is now extended in many directions; even to the "lookouts" on mountain tops from which a fire can be seen from a great distance away in every direction. Being of a comparatively primitive type, with trees used as poles in many places, a patrol is necessary to keep it in repair. Its installation has been amply justified, if only for the protection it has afforded against forest fires.

ALIENS.

During the year about 200 aliens were interned at Jasper. They were brought from Brandon, as it was thought that the cost of their internment could be largely offset by their employment on roads and other necessary work within the park. Owing to the labour stringency and to the fact that these interns were Austrians, not Germans, and had given evidence of their good behaviour, they were subsequently released on parole to work for the railways and in the coal mines. They were under the surveillance of the Royal Northwest Mounted Police, and there appears to be no reason up to the present to regret their release.

In closing this report, and in contemplation of another summer of war before us, I beg to assure you that this park will endeavour to keep in mind the matter of economy which you have brought before us, and also the employment of returned soldiers wherever possible, as has been done during the past year.

A. DRISCOLL.

APPENDIX No. 7.

REPORT OF THE SUPERINTENDENT OF BUFFALO PARK.

WAINWRIGHT, Alta., March 31, 1917.

The land under crop this year consisted of 400 acres at the south end and 30 acres at the north end, the latter being cut for green feed for the animals in the home paddock. Part of this land had been prepared the previous fall. As soon as seeding operations were over we began work on the fireguards; part of these were gone over with discs, but all the guards around and across winter quarters and the farm were ploughed, and it is my intention to plough all the fireguards during the coming year. During the past year there have been several fires just outside the park boundary, but only one occurred inside; this was caused by lightning. It was discovered by one of the wardens shortly after it started; he immediately gave the alarm, and after several hours' fighting we succeeded in putting it out before any serious damage was done.

When we had finished work on the fireguards we began ploughing summer fallow, and 200 acres were turned over. I might mention in connection with our farming operations that of the 600 acres that have been broken for crop we are summer-fallowing one-third each year. Owing to the season being so wet, we experienced considerable difficulty in getting the necessary amount of hay put up. However, we succeeded in putting up some 225 tons of good upland hay in the vicinity of Jamieson lake, to be used at the north end, and although we were unable to get on to the meadow at the south end, we managed, by cutting along the edges, to get about 220 tons.

Our crop suffered from both the hail and frost that struck our district last year, but we were more fortunate than many others, for after leaving a portion for green feed we had 14,617 bushels of oats threshed, and while the quality was not quite up to the grade of the previous year's crop yet they are a splendid grade of feed oats.

In connection with the farming operations carried on in Buffalo park, I wish to point out that in addition to the quantity of oats required for our own use we have supplied the requirements of the various Dominion Parks, and also those of the Forestry Branch and the Topographical Surveys Branch in both Alberta and Saskatchewan, in all 19,530 bushels were shipped during the year.

The main fence was found to be badly in need of repair and on the 15th of July a gang of men was started at this work. We began with the fence surrounding the home paddock enclosure, then moved to the west side, beginning two miles south of the Rocky Ford, we worked north, east and south on the main fence to winter quarters. In all about 2,500 new posts were put in and any of the old posts that were found suitable were reset.

In addition to repairing the main fence considerable new fence was erected. At the northwest corner of the park the main fence was moved and about 1½ miles of new fence constructed. This was done to permit the building of a suitable road around the outside of the park for the accommodation of the settlers living on the west side who heretofore were obliged to use the trails across the park when coming to town, which was unsatisfactory to them and a source of worry to the officers of the park owing to the uncertainty of the gates being closed properly.

In the home paddock the low fence separating the horse pasture was replaced by a 7-foot fence, this being necessary to prohibit the buffalo from getting in among the horses.

Another piece of new fence was erected from the southeast corner of the small park in an easterly direction to the main fence, a distance of about 1¾ miles. This was for the purpose of completely fencing off Mott lake, as it has been decided to have a summer resort at this lake. With this object in view, 60 lots were surveyed last fall, all of which are fronting the lake and are located at the most convenient and prettiest part of it. The opening of this resort during the coming summer will certainly be appreciated by the people of this district.

The trees and shrubs around the superintendent's quarters are doing very well, but just as soon as conditions will permit I should like to see some improvements made to these grounds, also some repairs made to roads, especially those used by visitors to the park.

Our telephone line has given splendid satisfaction during the year, and has been of great assistance during the season of danger from fire, and I hope to see the line extended to the west side of the park during the coming year.

I am pleased to report that our horses have come through the year's work in splendid shape. It is unfortunate that there were no colts this year, but all the mares have been bred and while we cannot hope for as good success as if we had a horse of our own yet we are in hopes of having a good bunch of young stock next year.

WILD ANIMALS.

There was an increase of 356 buffalo during the year. The decrease was small considering the size of the herd. I am pleased to report that they have stood the long cold winter well and are in exceptionally good shape. It has been remarked by many that the herd has never looked better than during this past winter, reflecting great credit on those directly in charge of the feeding of the animals. The young stock of the present give us every reason to believe that the future herd of buffalo will be made up of a much better type of animal than many of the original herd.

The elk have done exceptionally well this year—the natural increase has been 17. It is certainly a grand sight to see such a splendid herd of elk.

There has been no increase in moose this year, but the herd seems to be doing nicely. One young female was shipped in during the year and she has done very well.

The three male antelope are the picture of health; two of these are in the home paddock and the other one is in winter quarters. This one is always found in company with a couple of old buffalo bulls; they, no doubt, protect him from the coyotes.

The mule deer seem to be increasing rapidly. We have not got an accurate count of these but it is a common sight to see 25 in a bunch, sometimes more, and I am of the opinion that if the number were known there would be over 300.

During the winter 20 head of cattalo were brought in here by the Department of Agriculture. These are rather an interesting animal, having the appearance of both the buffalo and the domestic cow. I am pleased to report all of these are in good condition and appear quite contented in their new quarters.

The animals in Buffalo park at the present time are as follows:—

Buffalo	2,397
Elk	70
Moose	17
Antelope	3
Mule Deer (estimated)	100
Cattalo	20
Total	2,607

Buffalo park is not only an animal preserve, but the feathered game also realize the protection afforded them. The numerous lakes and ponds are the home of the wild

geese and duck, while prairie chicken and many kinds of birds are to be found within the limits of the park.

The total number of visitors during the year was 1,206. This number was not as great as during some of the previous years, due, no doubt, to the falling off in the tourist traffic.

In conclusion I wish to thank the officials of the park for the support they have given me throughout the year, also to express my appreciation of the assistance afforded me by yourself and other officers of the Parks Branch.

A. G. SMITH.

APPENDIX No. 8.

REPORT OF THE SUPERINTENDENT OF ELK ISLAND PARK.

Only the most necessary work was undertaken during the year owing to war conditions. We had 4,000 fence posts shipped to Lamont from Jasper park. These I had hauled and distributed along the park fence in preparation for replacing the old posts. In the spring to insure a longer life to the posts, I had them peeled and treated with antiseptine, and as soon as the frost was out of the ground the work of setting them in the fence was commenced. This work was done on the northwest and south sides. These were not finished, with the exception of the deep sloughs, the water being too deep in summer and the early winter setting in with such severity it could not be done then either, but I hope to finish it this spring, and then we shall have a good fence for a number of years to come, the east side having been built two years ago.

ROADS.

The latter part of June and the first part of July, I had the main road into the park and on into the buffalo pasture repaired as far as funds would permit. We did not get as good a job as we should have liked and hope to improve this road next year. However we made it passable which it was not before. I should like to see the Sandy Beach road finished as it would serve a double purpose of road and inside fire guard.

HAYING.

We started the haying the last week in July and had a very bad haying season indeed. It rained almost every day and often for three days at a time with the result that the hay sloughs were filled with water so could not be cut. We only got up about 125 tons of poor quality hay. I find that we shall have to go farther south onto the reserve for a sufficient quantity of hay next year. This will necessitate a longer haul in winter, but it is the only way we can procure the required amount for our increased herd of buffalo. We were fortunate enough to get good straw to help out our small hay supply. The animals appear to relish it and are doing well on it. Such a severe winter has been hard on feed; we had a great depth of snow with extreme cold and at such times the animals require more feed, but they have wintered well.

FIREGUARD.

On the completion of the haying we started ploughing the fireguard and a splendid job was made of it, but I find the growth of grass and weeds so rank that it will be necessary to disc it in June and plough it in the fall, that we may have a good guard.

FIRES.

We had a small fire in the park last May. The fire came from the southeast over the reserve with a very high wind and jumped the guard but as I was there with a party of men, we got it under control before any damage was done.

VISITORS.

We had very few campers this year as the weather was so wet and cold all the camping season, and tenting is not pleasant under such conditions. I have had

numerous inquiries in regard to renting lots for a term of years on which to build cottages, and I think it would be well to have lots surveyed ,for that purpose as it is a pity to shut the people, particularly of these parts, out from this lovely lake; it would not interfere with the animals at all, and would add considerably to ,the revenue of the park.

With your permission I should like to have a piece of ground convenient to the picnic grounds prepared as a sports ground, as there is not a spot for ball or even foot races, and picnickers miss it very much. It would certainly add to the popularity of the place as a picnic resort and should not be a very great expense.

We had 1,532 visitors to the park during the year.

ANIMALS.

It is often very difficult to get teams to do the work at the proper time. If we had four good work horses of our own much expense might be saved and more satisfactory work done because it could be done at the right time.

We had an increase of 28 buffalo calves this year and no loss, the elk, moose, and deer are also increasing rapidly. Last fall when patrolling the fence, 67 elk were counted in one herd. They were all cows and young stock, and were feeding in a slough at the time. I estimate the elk at 100, the same number of deer, and the moose at 46.

The total number of animals in the park is as follows:—

Buffalo	134
Moose	46
Elk (estimated)	100
Deer	100

During the hunting season the park needs careful watching and it would be well, I think, in November and December to put a man on steadily at this work, as well as to keep a lookout for poachers. He would also have a splendid chance to get an idea of how many wild animals are in the park, and at the same time he could cut water holes in the big sloughs where the buffalo are feeding. This would keep the buffalo out on the range for at least a month longer, or until the snow got too deep.

ARCHIBALD COXFORD.

REPORT OF THE ST. LAWRENCE ISLANDS PARKS.

There are twelve islands and a parcel of mainland included in these parks, containing in all approximately 150 acres. They are scattered along the St. Lawrence river between Brockville and a few miles west of Gananoque, and may easily be distinguished by large sign boards on which is written "Dominion Public Lands."

Most of the islands are equipped with wharves, pavilions, camp-stoves, closets, tables, benches, garbage cans, etc.; in fact, all the equipment and shelter necessary to campers or day visitors.

Each island or group of islands has a caretaker who looks after the park and its equipment, issues camp permits, and sees that all parks regulations are complied with.

Very little expenditure was made on these islands during the past year, the chief items being for caretakers' salaries and small repairs or additions to the equipment. This does not necessarily mean that the islands were not made use of to a great extent by the public. The caretakers report that each year sees a greater number of visitors and campers to these island parks, and although no official record is kept, it was considered that the number of visitors during the past year was in excess of all previous years.

FORT ANNE HISTORIC PARK.

By Order in Council of January 24, 1917, the site of old Fort Anne, at Annapolis Royal, N.S., was transferred by the military authorities to the Department of the Interior and created a Dominion Historic Park.

This old fort was the centre of many of the stirring events in the early history of Nova Scotia. It approximately marks the site of the first permanent settlement of European emigrants in this Dominion. Three years before Champlain founded Quebec, a fort and village were to be found nestling on the shores of the Basin at Port Royal. Here was launched the first vessel built on this continent, and the first grist mill in North America was erected on the river L'Equille within a short distance of the fort and under the protection of its guns. Port Royal may be termed the cradle of Canadian civilization. With it are connected names of world-wide interest, among them those of the poet L'Escarbot, Pontgrave, Des Monts, Champlain and the noble Poutrincourt, to whom, more than to any other, was due the permanent settlement of these shores.

The site of the park covers about thirty acres, and comprises relics of the old fort, consisting of the officers' quarters, magazine and sally-port. It is situated at the confluence of the Annapolis and L'Equille rivers, commanding a magnificent view of the Basin.

Owing to the strict economy necessitated by the war, only such improvements as are absolutely necessary for preservation will be undertaken at the present time.

SESSIONAL PAPER No. 25

METEOROLOGICAL TABLES.

MAXIMUM AND MINIMUM TEMPERATURES and the General State of the Weather between April 1, 1916 and March 31, 1917, at *Banff*, Rocky Mountains Park.

Date 1916	Thermometer Readings. Maximum for day.	Thermometer Readings. Minimum for day.	Weather, etc.
April 1	43·0	30·2	Fair; snow to 9 a.m.—about 11 inches snow on ground 6 a.m.; a few sleighs out. Snow goes quickly; patches to about 3 inches by 6 p.m. Warming sun. Bow open to above boathouse. Very sloppy walking in places.
" 2	42·0	24·7	Fair; snow flurries.
" 3	44·5	27 0	Cloudy; mild.
" 4	37·3	29·5	Cloudy; light snow a.m. Mostly overcast.
" 5	45·1	24·8	Fair; fall of rain, snow flurry; fresh southwest wind.
" 6	51·2	25·3	Fair; perfect day.
" 7	54·3	22·6	Fair; very fine day. Bow river open.
" 8	52·0	33·0	Fair; very fine day.
" 9	47·0	30·2	Cloudy; mostly overcast, strong southwest wind and rain.
" 10	48·1	31·9	Cloudy.
" 11	35·	27·8	Overcast; snow.
" 12	44·9	25·9	Fair; windy.
" 13	54·0	35·0	Fair; southwest gale.
" 14	47 2	38·2	Cloudy; rain.
" 15	39·1	25·0	Cloudy; snow early a.m.
" 16	46·3	22 9	Fair; fine day; chilly a.m.
" 17	47·0	21·7	Cloudy; snow evening.
" 18	43·5	25·5	Fair; fine day.
" 19	47·3	26·8	Cloudy.
" 20	48·5	29·1	Fair.
" 21	41·9	28·0	Cloudy; light rain and snow, soft hail and snow storm 11.30 a.m.
" 22	40·9	21·9	Fair; soft hail storm; chilly day.
" 23	47·8	19·1	Fair; very fine day.
" 24	55·0	24·3	Cloudy.
" 25	65·0	26·2	Fair; perfect day.
" 26	69·3	27·6	Fair; very fine day.
" 27	65·0	31·2	Fair; rain, gale southwest, thunderstorm. Zodiacal lights at night.
" 28	43·0	33·9	Cloudy; mostly overcast. Heavy snow-fall. Dull, raw.
" 29	40·0	28·8	Cloudy; snow; Aurora.
" 30	55·2	23·8	Fair; fresh southwest wind. Fine day; patches of snow on ground.
May 1	52·3	32·9	Fair; rain; fresh snow on mountains, fine afternoon.
" 2	63·8	25·0	Fair; very fine day, no snow on ground.
" 3	60·3	41·8	Fair; fine day; fresh southwest wind.
" 4	63 9	46·0	Fair; southwest gale.
" 5	59·9	38·9	Fair; rain, very fine day.
" 6	62·0	33·0	Fair; rain to heavy rain; fresh snow on mountains higher up.
" 7	38·9	29·0	Fair; southwest gale.
" 8	44·0	29·6	Cloudy; light snow fall but heavy snow storm.
" 9	44·3	25·0	Cloudy; soft hail storm, cool.
" 10	46·0	27·3	Cloudy; soft hail showers off and on; chilly.
" 11	49·1	26·2	Fair; snow during night and soft hailstorms.
" 12	47·8	26·7	Fair; over three inches snow on ground 6 a.m.
" 13	46·1	29·4	Fair; soft hail.
" 14	52·3	24·8	Fair; light rain—ice out of lake Minnewanka.
" 15	50·0	29·3	Cloudy; light snow; soft hailstorms.
" 16	54·0	26·5	Cloudy; fine day.
" 17	53·2	34·8	Cloudy; rain.
" 18	61·2	30·7	Cloudy; rain evening.
" 19	54 8	32·6	Cloudy; light rain evening.
" 20	53·6	32·2	Cloudy; rain, southwest gale.
" 21	42·1	31·8	Cloudy; light snow; cool.
" 22	47·8	32·1	Cloudy; light snow; fresh snow on mountains.
" 23	46·5	33·2	Cloudy: rain evening; snow evening heavy.
" 24	37·2	32·2	Overcast; snow, rain 6 p.m.; six inches of snow on the ground 6 a.m., total fall ten inches, trees laden with snow.
" 25	45·0	32·3	Cloudy; only a few small patches of snow remain.
" 26	60·2	32·2	Fair; fine day.
" 27	58·2	32·2	Cloudy; fine day.
" 28	39·0	32·8	Overcast, heavy rain and heavy snow through night.
" 29	43·2	32·2	Cloudy; snow. Mountains mostly obscured by cloud; about three inches of snow on ground. Very slushy. Much fresh snow on mountains.
" 30	39·8	32·5	Overcast, rain; 2 a.m. very light snow; mountains obscured by cloud.
" 31	46·4	33·8	Cloudy, snow and rain, snow.

METEOROLOGICAL TABLES.—*Continued.*

MAXIMUM AND MINIMUM TEMPERATURES and the General State of the Weather between April 1, 1916 and March 31, 1917.—*Continued.*

Date, 1916.	Thermometer readings.		Weather, etc.
	Maximum for day.	Minimum for day.	
June 1	51·1	29·7	Fair ; heavy snow ; very little if any snow about town, fine afternoon.
" 2	49·	32·0	Cloudy.
" 3	61·4	35·8	"
" 4	57·0	40·8	Cloudy ; rain and through night.
" 5	54·9	34·0	Fair ; fine day.
" 6	55·0	28·5	Fair.
" 7	63·0	30·8	Fair ; fine day and night ; windy.
" 8	65·8	34·9	Fair ; very fine day.
" 9	55·2	40·0	Cloudy ; rain.
" 10	53·3	36·8	Cloudy ; trace of rain ; fine day.
" 11	60·1	40·0	Fair ; fine day.
" 12	61·0	38·7	Cloudy ; rain at night.
" 13	62·0	40·0	Cloudy ; fine day.
" 14	70·9	39·2	Fair ; snow slide down face of Cascade Mountain.
" 15	76·7	40·8	Fair ; very fine ; much snow gone on mountains in past two days.
" 16	78·9	40·6	Fair ; very fine.
" 17	76·0	41·3	Fair ; trace of rain ; very fine day, fresh wind, Bow very high and Spray.
" 18	78·3	41·8	Fair ; rain at night. Thunder, fine but hot.
" 19	59·4	47·9	Cloudy ; heavy rain.
" 20	56·2	45·0	Cloudy ; heavy rain ; much water valley west of railway station. clouds low on mountains. Bow and Spray rivers reach their highest for the year.
" 21	58·6	39·0	Cloudy, rivers commencing to drop.
" 22	62·3	31·8	Fair ; fine afternoon.
" 23	65·2	35·4	Fair ; fine day.
" 24	69·3	37 9	Fair ; thunder ; fine day.
" 25	70·1	40·8	Fair.
" 26	56·0	45·2	Cloudy ; rain.
" 27	68·2	43·0	Fair.
" 28	62 0	48·8	Cloudy ; rain.
" 29	53·8	39·8	Cloudy ; rain.
" 30	66·2	47·5	Fair ; fine day.
July 1	70·8	40·5	Fair.
" 2	62·0	50·0	Cloudy ; rain.
" 3	55·5	50·0	Cloudy ; rain.
" 4	61·8	46·0	Fair ; gale S.W.
" 5	66·0	36·2	Fair ; light showers.
" 6	70·5	37·0	Fair.
" 7	71·0	50·0	Fair.
" 8	80·8	53·2	Fair ; thunder, light rain.
" 9	75·2	50·0	Cloudy ; rain, thunderstorms.
" 10	72·8	48·0	Fair.
" 11	70·5	57·0	Cloudy.
" 12	80·5	43·8	Fair ; rain at night.
" 13	64·2	46·5	Fair ; rain : thunderstorms.
" 14	63·2	48·5	Fair ; fresh W. wind, fine day.
" 15	70·2	38·0	Fair.
" 16	76·1	51·0	Fair ; rain ; thunderstorms ; fine day.
" 17	71·8	49·7	Fair ; heavy rain at night ; fine day.
" 18	64·2	46·5	Cloudy.
" 19	64·9	44·8	Fair ; light rain ; fine day.
" 20	64·2	48·0	Fair ; fresh S.W. wind ; coolish day.
" 21	65·2	47·4	Cloudy.
" 22	59·0	45·3	Cloudy ; rain ; light fresh snow on top higher mountains.
" 23	65·1	36·0	Fair.
" 24	64·9	41·3	Cloudy ; rain evening.
" 25	62·5	46·2	Cloudy ; rain.
" 26	61 8	47·0	Cloudy ; rain.
" 27	64·0	46·5	Fair ; rain ; thunderstorm, P.M. clouds low on mountains early a.m.
" 28	63·5	38·0	Fair ; light rain ; fine afternoon.
" 29	69·8	35·0	Fair ; fine day.
" 30	76·1	35·2	Fair ; very fine day.
" 31	84·1	36·4	Fair ; thunderstorm passes over N.E. very fine day.

METEOROLOGICAL TABLES.—*Continued.*

MAXIMUM AND MINIMUM TEMPERATURES and the General State of the Weather between April 1, 1916 and March 31, 1917.—*Continued.*

Date, 1916.	Thermometer readings.		Weather, etc.
	Maximum for day.	Minimum for day.	
Aug. 1	76·5	45·0	Fair ; sheet lightning ; fine day. Aurora.
" 2	68·0	43·8	Cloudy ; very fine last night and bright a.m.
" 3	55·0	45·5	Cloudy ; rain ; thunderstorm ; light fresh snow about 9,500 ft.
" 4	62 2	33·2	Fair ; very fine day ; thunder.
" 5	68·4	40·7	Fair ; thunder ; fine day ; very fine Zodiacal lights.
" 6	71.2	34·5	Fair ; very fine day.
" 7	78·0	38·6	Fair ; very fine day.
" 8	74·1	44·7	Fair ; very fine till early afternoon ; trace of rain ; heavy rain 8 p.m. through night ; thunderstorm 4 p.m., etc.
" 9	60·9	45·1	Cloudy ; heavy rain.
" 10	58·9	37·6	Fair ; fresh N.E. wind a.m ; very fine most of day.
" 11	70·2	33·0	Fair ; perfect day.
" 12	76·0	35·9	Fair ; perfect day.
" 13	79·4	37·8	Fair ; very fine day.
" 14	75·2	45·0	Fair.
" 15	72·8	45·0	Fair.
" 16	56·1	44·0	Cloudy ; rain ; thunderstorm.
" 17	54·3	41·2	Cloudy ; rain ; clouds low on mountains.
" 18	44·3	33 0	Overcast ; heavy rain and 1 inch of snow ; rain, sleet, snow. Several inches of fresh snow on mountains.
" 19	55·3	39 3	Cloudy ; light rain.
" 20	53·3	38·9	Cloudy ; rain ; chilly day.
" 21	65·0	35·2	Fair ; fine day.
" 22	73·0	42·2	Fair ; very fine day ; snow fast disappearing on mountains ; strong S.W. warm wind.
" 23	78·2	43·0	Fair ; very fine day.
" 24	79·8	39·5	Fair ; very fine day.
" 25	73·8	41·8	Fair ; light rain.
" 26	79·5	41·0	Fair ; perfect day. Aurora.
" 27	80·0	39·8	Fair ; perfect day.
" 28	76 8	37·4	Fair ; very fine day.
" 29	79·8	46·8	Fair ; fine day.
" 30	78·0	44·8	Fair ; all mountains hid by fog 6 a.m. Hazy like smoke.
" 31	72·5	49·8	Fair ; rain.
Sept. 1	69·2	47·8	Cloudy ; light rain ; thunderstorm.
" 2	71·0	48·8	Fair ; lightning evening.
" 3	54 0	48·3	Cloudy ; rain ; clouds low on mountains ; thunderstorm.
" 4	59·3	47·0	Cloudy ; rain.
" 5	60·7	44·0	Cloudy ; rain ; fine day ; chilly night ; fresh snow on higher mountain tops.
" 6	59·2	33·6	Fair ; fine day ; clear, cold night.
" 7	65·3	32·9	Fair ; very fine day.
" 8	60·2	40·8	Cloudy ; rain ; fresh snow on higher mountains.
" 9	50·0	38·0	Cloudy ; rain ; fresh snow half way down mountains ; clouds low on mountains.
" 10	56·1	29·2	Fair ; fresh S.W. wind ; cold morning and ice in places.
" 11	57·3	42·4	Cloudy ; fresh S. wind ; rain at night.
" 12	46·2	36 2	Cloudy ; rain ; light snow at night. Fresh snow on mountains.
" 13	50·9	29·2	Fair ; about 1 foot of fresh snow on higher mountains to date.
" 14	60·3	26·1	Fair ; perfect day ; ground surface frozen ; thin ice on still water.
" 15	66·1	28 5	Fair ; perfect day.
" 16	68·2	30·2	Fair ; perfect day.
" 17	70 3	31·2	Fair ; perfect day. Aurora.
" 18	69·8	31·8	Fair ; perfect day.
" 19	66 5	35·8	Fair ; very fine.
" 20	65·5	26·5	Fair ; perfect day,
" 21	70·0	27·8	Fair ; perfect day.
" 22	59·8	32·2	Cloudy ; fine day. Aurora.
" 23	66·3	30·0	Fair ; perfect day.
" 24	60·6	33·2	Fair ; fresh S.W. wind ; cloudy about noon.
" 25	50·2	42·9	Cloudy ; light rain ; some leaves falling off trees. Very fresh light snow on mountains.
" 26	51·0	36·8	Cloudy ; light rain early a.m. ; trace of rain on and off.
" 27	48·8	33·2	Fair ; fine day ; cool, clear and cold night.
" 28	50·5	24·8	Cloudy ; ice on water ; cold a.m.
" 29	56·2	29·0	Fair : strong S.W. wind ; rain at night ; a gale in more open places afternoon ; fine day.
" 30	43·2	31·8	Cloudy ; snow ; one inch snow on ground 6 a.m. ; three inches or more fresh snow on mountains and soft hail.

METEOROLOGICAL TABLES.—*Continued.*

MAXIMUM AND MINIMUM TEMPERATURES and the General State of the Weather between April 1, 1916 and March 31, 1917.—*Continued.*

Date 1916.	Thermometer readings.		Weather, etc.
	Maximum for day.	Minimum for day.	
Oct. 1	32·0	24·2	Cloudy; 1 inch snow on ground at 6 a.m. Chilly.
" 2	31·9	24·3	Cloudy; snow flurries; 1 foot snow reported at Exshaw.
" 3	33·0	23·9	Cloudy; chilly, dull-like day.
" 4	42·1	14·3	Fair; fine day; roads hard, ice thick on water-barrels, frost on windows.
" 5	50 0	29·3	Fair, strong S.W. wind. Very fine day.
" 6	41·0	30·1	Cloudy; rain, light soft hail; light snow evening, fresh snow on mountains.
" 7	40.2	23·6	Fair; very fine day.
" 8	50·8	27·5	Fair.
" 9	60·5	25·8	Fair; very fine day.
" 10	63·7	24·3	Fair; perfect day.
" 11	60·0	28·2	Fair; very fine day.
" 12	62·4	27·7	Fair; very fine day.
" 13	63·3	34·5	Fair; gale southwest, very fine day. Leaves and twigs blowing off trees.
" 14	50·2	42·3	Cloudy; though fine and warm, moths about the last few days.
" 15	63·2	39·1	Cloudy; S.W. gale; light rain at night. Quite warm.
" 16	56·2	38·8	Cloudy; strong S.W. wind, light rain and rain at night.
" 17	34·1	29·3	Cloudy; snow, 1½ inches snow on ground 6 a.m.
" 18	35·9	17·8	Fair; very fine day. Patches of snow on ground.
" 19	40·1	21·8	Cloudy; strong S.W. wind.
" 20	48·2	28·1	Fair; Strong S.W. wind; snow blowing off mountains.
" 21	39·1	32·5	Cloudy; snow flurries.
" 22	42·8	27·9	Fair; fine day.
" 23	46·2	28·6	Cloudy; strong S.W. wind.
" 24	47·7	31·8	Fair; chinooking at night.
" 25	44'6	37·3	Cloudy; rain and through night. Fresh snow on mountains.
" 26	45·2	33·4	Cloudy.
" 27	39 3	31·3	Fair; fine afternoon.
" 28	37·9	23·4	Fair; strong S.W. wind—fine day.
" 29	36·1	30·3	Cloudy; S.W. gale; light snow—cold wind afternoon.
" 30	35·4	28·8	Cloudy; strong S.W. wind; snow evening.
" 31	38·8	28·0	Cloudy.
Nov. 1	36·6	29·5	Fair; light snow. Fair afternoon.
" 2	40·5	25·7	Cloudy; light rain and light snow,
" 3	38·9	26·3	Cloudy; rain evening and through night; mostly fair a,m,
" 4	39 3	32·3	Cloudy; rain, light snow and fresh snow on mountains.
" 5	36·1	28·3	Cloudy; light snow.
" 6	34·1	16·9	Fair; fine day, ice on pools and sides of rivers.
" 7	30·9	10·4	Fair; Bow river frozen over above boat-house.
" 8	33·8	26·9	Overcast; snow evening and through night.
" 9	34·9	24·5	Cloudy; snow afternoon.
" 10	17·1	8·6	Cloudy; light snow; bad sleighing.
" 11	6·8	— 5·0	Fair; cold.
" 12	8·1	—20·6	Fair; bright, clear day; about 4 inches of snow on ground. Bow frozen over.
" 13	17·4	— 3·8	Fair; strong cold west wind all day.
" 14	23·5	6·8	Fair; southwest gale.
" 15	29·0	10·0	Fair; strong west wind; very fine day.
" 16	34·9	13·2	Fair; perfect day; skating on river.
" 17	33·3	16·3	Fair; gale southwest; very fine day, clear nights 15th to 17th, inclusive.
" 18	33·1	15 2	Fair; southwest gale; very fine day. Patches to 3 inches of snow on ground.
" 19	31·7	21·7	Fair; very fine day, clear night.
" 20	27·9	9·7	Fair; fine day, very windy evening and through night.
" 21	34·9	22·5	Fair; southwest gale, otherwise fine day-
" 22	32·1	23·3	Cloudy; light snow, clear night.
" 23	20·0	— 2·3	Fair; much frost on trees, clear night.
" 24	24·0	6·1	Fair; southwest gale, wind cold through night.
" 25	28·2	18·9	Cloudy; snow flurries evening.
" 26	29·1	14·6	Fair; very fine day.
" 27	30·0	20·1	Cloudy; snow.
" 28	33·0	27·0	Cloudy.
" 29	28·2	20·2	Fair; snow 8.30 p.m. and through night.
" 30	28·3	22·6	Fair; light snow a.m., strong gale southwest; snow drifting very much off mountains and town; sleighing still but bad.

SESSIONAL PAPER No. 25

METEOROLOGICAL TABLES.—*Continued.*

MAXIMUM AND MINIMUM TEMPERATURES and the General State of the Weather between April 1, 1916 and March 31, 1917.—*Continued.*

Date. 1916.	Thermometer readings. Maximum for day	Thermometer readings. Minimum for day.	Weather, etc.
Dec. 1	27·2	19·8	Fair; southwest gale. Ice on Bow river about 8 inches.
" 2	39·1	22·9	Cloudy.
" 3	32·2	27·7	Cloudy; light snow afternoon; a drop of 33° in 20 minutes, in humidity, 5.45 p.m. 7 p.m. stormy, very windy, snow drifting.
" 4	25·9	22·7	Cloudy; southwest gale, snow drifting.
" 5	23·8	13·5	Fair; snow flurries. Fine day.
" 6	11·1	− 6·2	Fair; bright, cold, calm day.
" 7	15·2	− 5·0	Fair.
" 8	17·8	6·2	Fair; very large lunar halo and very distinct.
" 9	15·7	− 9·5	Fair; cold but fine. Bow river ice 10 inches.
" 10	16·2	−14·0	Fair.
" 11	31·2	13·2	Fair; chinooking, clear, cold night, light snow a.m.
" 12	22·8	1·0	Fair; light snow through night from 8.30 p.m.
" 13	20·0	7·3	Fair; Lake Minnewanka all frozen over.
" 14	31·2	0·8	Fair; fine day though coldish wind.
" 15	27·6	15·3	Cloudy; southwest gale going to northwest, snow flurries.
" 16	22·2	9·7	Fair; ice on Lake Minnewanka about 4 inches thick; Bow river ice about 12 inches thick; fine day, about 5 inches of snow on ground and from none to bad sleighing.
" 17	21·0	− 7·3	Fair; strong west wind.
" 18	24·9	15·9	Cloudy; strong west wind, light snow.
" 19	15·3	5·2	Fair; fine day though coldish.
" 20	3·0	−13·7	Fair; misty early a.m.
" 21	− 4·0	−20·4	Fair; misty early a.m.; bright, calm, cold.
" 22	2·9	−20·3	Fair; misty early a.m.
" 23	− 2·9	−15·2	Fair; snow flurries; Bow river ice about 14 inches, cold light wind N.E., about 4½ inches snow on ground, sleighing still bad.
" 24	− 3·8	−10·9	Fair; 20 mile N.E. wind, Parhelion.
" 25	−11·2	−26·0	Fair; bright, mostly calm and cold.
" 26	−12·2	−34·7	Fair; bright, calm and clear all day, Aurora.
" 27	− 2·9	−21·5	Fair; bright, clear and mostly calm.
" 28	1·4	−28·1	Fair; bright, clear.
" 29	8·1	−12·4	Cloudy; strong west wind.
" 30	14·4	3·7	Cloudy; southwest gale.
" 31	21·8	10·5	Fair; fine day; about 3½ inches of snow on ground. Sleighing still bad.
Jan. 1	25·2	18·0	Fair.
" 2	26·0	14·8	Cloudy; ice as cut on Bow river 26 inches through.
" 3	27·5	21·0	Cloudy; fine mild day.
" 4	12·5	5·0	Cloudy; snow.
" 5	32·5	3·0	Cloudy; snow; fine evening.
" 6	31·8	24·0	Fair; fine mild day; sleighing good.
" 7	32·5	18·5	Cloudy; strong west wind, eclipse of moon visible 11 p.m. to midnight, about 6½ inches snow on ground.
" 8	37·2	31·2	Cloudy; strong west wind; sleighing bad.
" 9	35·8	28·5	Fair; west gale early a.m.
" 10	35·8	23·8	Cloudy; gloomy day.
" 11	30·5	12·0	Cloudy; light snow, snow flurries.
" 12	0·0	−23·2	Fair; clear bright day.
" 13	15·0	− 2·2	Cloudy; light snow. About 5½ inches of snow on ground. Sleighing bad.
" 14	12·8	− 2·0	Fair; cold, but perfect winter day.
" 15	7·0	−19·0	Fair; calm, fine day.
" 16	22·5	− 5·1	Fair; fine day.
" 17	19·0	7·0	Fair; very fine afternoon and evening, ice on Bow river 29 inches.
" 18	19·5	9·5	Cloudy; strong west wind; snow drifting.
" 19	19·0	2·8	Fair; fine day.
" 20	10·0	− 5·9	Cloudy; Parhelion 4 p.m., about 5½ inches snow on ground. Sleighing bad.
" 21	3·2	−24·8	Fair; cold north to northeast wind.
" 22	18·8	1·2	Cloudy; fine morning.
" 23	20·2	− 3·8	Cloudy; fine day.
" 24	31·0	16·0	Cloudy; fine day.
" 25	34·2	24·0	Cloudy; snow flurries; ice on Bow 30½ inches.
" 26	27·2	23·8	Cloudy.
" 27	19·6	..	Cloudy; snow, finish ice cutting on Bow river. About 5 inches of snow on ground; sleighing bad.
" 28	−11·0	−15·5	Cloudy; snow, snow drifting.
" 29	−23·0	−28·2	Cloudy; dull gloomy day, cold northeast wind with light snow flurries. Sleighing good.
" 30	−20·2	−31·2	Fair; bright cold day, northeast wind.
" 31	−21·8	−38·9	Cloudy.

METEOROLOGICAL TABLES—*Concluded.*

MAXIMUM AND MINIMUM TEMPERATURES and the General State of the Weather between April 1, 1916 and March 31, 1917—*Concluded.*

Date 1917.	Thermometer readings.		Weather, etc.
	Maximum per day.	Minimum per day.	
Feb. 1	0·0	−43·5	Cloudy.
" 2	25·0	− 2·0	Cloudy.
" 3	29·0	−11·0	Cloudy; snow; sleighing good, 6½ inches of snow on open ground.
" 4	43·8	−11·2	Cloudy.
" 5	43·8	33 0	Fair; very fine and mild day, snow going fast.
" 6	41·2	16·0	Fair; fine day.
" 7	43·0	32·0	Cloudy; fine day.
" 8	42·5	27·0	Cloudy; fine day; very fine sunset.
" 9	34·0	25·2	Cloudy.
" 10	38·0	18·8	Fair; very fine day.
" 11	35·8	26·8	Cloudy.
" 12	35·9	12·9	Fair; perfect day.
" 13	33·0	3·0	Fair; fine day.
" 14	40·3	10·6	Fair; very fine day.
" 15	42·7	27·0	Cloudy; gale chinook 7 p.m.
" 16	28·4	23·0	Cloudy; light snow.
" 17	4·9	− 7·0	Fair; cold N.E. wind; about 3 inches snow on ground; sleighing bad.
" 18	13·0	−17·4	Fair; strong cold N.W. wind. Aurora.
" 19	− 4·5	−13 5	Fair; cold N.E. wind; snow drifting.
" 20	− 9·0	−20·7	Cloudy; light snow at night; very cold N.E. wind.
" 21	− 8·3	−19·9	Fair; strong, very cold N.E. wind; clear night.
" 22	5·8	−20·6	Fair; light snow; clear night.
" 23	23·2	−21·8	Fair; very fine day. Clear night.
" 24	6·1	−15·0	Fair; light snow at night. Cold, strong N.E. wind.
" 25	6·0	− 8·9	Fair; blustery, cold N.E. wind.
" 26	17·4	−19·8	Fair; very fine day.
" 27	21·0	− 5 2	Fair; light snow flurries. Clear night.
" 28	23·7	−15·0	Fair; fine bright day; Ice on Bow river as cut 39 inches. Fine day. Still good sleighing on Hot Springs road—bad about Banff town. About 3¼ inches snow on ground.
Mar. 1	25·8	− 5·9	Fair; fine day.
" 2	22·1	−10·3	Fair; fine day. Clear night.
" 3	32·9	− 4·9	Fair; fresh S.W. wind—a little chilly.
" 4	35·7	21·9	Fair; strong S.W. wind.
" 5	36·2	18·7	Fair; large lunar halo 10 p.m.
" 6	34·9	11·3	Cloudy.
" 7	34·0	4·0	Fair.
" 8	34·9	10·2	Cloudy; snow late afternoon and evening.
" 9	26 3	10·7	Cloudy; bright clear cold night.
" 10	28·9	−11 1	Fair; perfect day; about 4 inches snow on ground. Sleighing bad.
" 11	32·9	− 7·1	Fair; perfect day.
" 12	31·7	0·9	Cloudy; fine day.
" 13	30·5	13·8	Cloudy; very light snow.
" 14	26·3	0·2	Cloudy; very light snow.
" 15	33·6	− 2·7	Fair; perfect day. Clear night.
" 16	38·1	− 2·7	Fair; perfect day.
" 17	42·3	8·4	Fair; about 3 inches of snow on ground; sleighing bad and only on sheltered roads—perfect day.
" 18	39·0	29·0	Cloudy; chinook wind. Fine day.
" 19	35·0	23·1	Cloudy; no sleighing.
" 20	30·5	15·7	Cloudy; light snow.
" 21	32·0	10·9	Cloudy; very light snow.
" 22	32·3	16 3	Cloudy.
" 23	33·0	21·2	Cloudy; snow and through night. Sleighing bad.
" 24	30·0	18·2	Cloudy; nearly overcast all day.
" 25	27·1	2·0	Cloudy; light snow flurries.
" 26	30·5	− 1·1	Fair; S.W. gale and through night; snow blowing off mountains.
" 27	35·0	20·9	Cloudy; snow; blustery; snow drifting.
" 28	34·9	3 9	Fair.
" 29	34·6	23·4	Cloudy; snow. Nearly overcast all day.
" 30	28·2	5·2	Cloudy; light snow; chilly S.W. wind—sleighing good,
" 31	26·7	0·7	Fair; sleighing good, about 6 inches of snow on ground.

N. B, SANSON,
Observer.

SESSIONAL PAPER No. 25

MONTHLY MAXIMUM AND MINIMUM TEMPERATURES.

Month.	Maximum.	Minimum.
January, 1916	19·1	−46·5
February, "	48·2	−37·0
March, "	50·8	−22·4
April, "	69·3	19·1
May, "	63·9	24·8
June, "	78·9	28·5
July, "	84·1	35·0
August, "	80·0	33·0
September, "	71·0	24·8
October, "	63·7	14·3
November, "	40·5	−20·6
December, "	39·1	−34·7
January, 1917	39·8	−38·9
February, "	44·2	−43·5
March, "	42·3	−11·1

MONTHLY AVERAGE TEMPERATURE.

Month.	Average.	—
January, 1916	−13·1	
February, "	15·6	
March, "	27·0	
April, "	38·0	
May, "	41·5	
June, "	51·4	
July, "	56·9	
August, "	55·4	
September, "	47·7	
October, "	37·8	
November, "	22·7	
December, "	7·4	Average annual monthly temperature 32·4.
January, 1917	11·4	
February, "	12·5	
March, "	20·1	

MONTHLY PRECIPITATION.

Month.	Rain.	Snow.	Total.
January, 1916		28·5	2·83
February, "		8·5	0·87
March, "	0·08	14·9	1·55
April, "	0·31	21·7	2·45
May, "	1·27	29·7	4·24
June, "	2·15	5·0	2·65
July, "	2·74		2·74
August, "	3·20	1·0	3·30
September, "	1·59	2·3	1·83
October, "	0·55	6·9	1·23
November, "	0·32	9·2	1·24
December, "		2·4	0·23
Annual Precipitation 25·15.			
January, 1917		7·3	0·73
February, "		3·4	0·34
March, "		11·3	1·13

The winter of 1916-17 the snow fall was less than the average.

NUMBER OF FAIR DAYS.

Month.	Days.	—
January, 1916	11	
February, "	17	
March, "	24	
April, "	21	
May, "	20	
June, "	21	
July, "	25	
August, "	17	NOTE.—15 thunder storms from April
September, "	18	to September.
October, "	16	
November, "	21	
December, "	19	
Total	for 1916—230	days.
January, 1917	24	
February, "	20	
March, "	20	

NOTE.—A fair day is one on which the average of the morning and evening observations amount of clouds makes 8 or less. The sky completely overcast is 10.

PART VI

FORESTRY

REPORT OF THE DIRECTOR OF FORESTRY

This report concerns the work of the Forestry Branch for the year 1916-17, and includes the reports of the officials in charge of the outside divisions.

Owing to the reduction of staff from the enlistment of a number of the officers of the branch for service in the army no new work of importance has been undertaken, and the operations of the branch generally have been kept to as small proportions as possible in view of the large extent of territory to be supervised and the value of the public forest property requiring protection.

The total number of men who have enlisted is sixty-five.

During the year we have unfortunately lost several of our men who were fighting in France. Mr. George E. Bothwell, forest assistant on the Athabaska forest reserve, was killed by the treachery of a German prisoner who had surrendered. Mr. Bothwell was one of the most promising among the young technically trained foresters on the staff, and the loss of his services will be very much felt. Mr. John B. Brophy, who was employed in the head office of the branch, met his death from an accident while flying in England. He had previously done good service in the Flying Corps in France. There are also two members of the forest ranger staff who were killed in action, namely, Mr. G. G. Fuller of the Bow River forest and Mr. J. W. Smith of the Long Lake forest reserve, British Columbia; and one member of the fire-ranging staff in British Columbia, Mr. William Waddell. They were all good officers whom the service could not afford to lose.

It is only right also to mention the names of some of the undergraduates of the forest schools who had been employed on forest surveys by this branch. Four of these young men gave up their lives in the war, namely, Jack B. Hipwell, A. M. Thurston, R. A. R. Campbell, and J. D. Aiken. They were among the most promising of the undergraduates of the forest schools, and it had been their hope, and ours, that they would take a large place in building up forest administration in Canada.

The past season in the western provinces was generally wet, so that the danger of fire was not as a rule serious. In some localities there were dry spells of considerable extent, but the patrol staff were able to control the situation so as to prevent heavy losses.

The great loss of life and property in the province of Ontario in the summer of 1916, as a result of forest fires, forced a careful consideration of the conditions which made such a disaster possible. The season in Ontario was particularly dry and the natural conditions the worst possible. Of the controllable factors the one most prominent in causing the disaster was that of fires set out by settlers for clearing lands in conditions under which, as was found by the result, it was impossible to regain the mastery over them. It was felt, therefore, that the control of such fires was a necessary thing for the safety of the settlements now so generally extending into wooded districts. The setting out of fires on Dominion forest reserves is controlled by the provisions of the Forest Reserves Act and the regulations made thereunder, and the legislation in this respect is sufficient to meet the case. But, on the large areas of Dominion lands outside of forest reserves the matter is governed by the provincial fire acts, or by the homestead regulations; and outside of the province of British Columbia none of these previous to January, 1917, contained any provision which gave power to control the setting out of fires. The permit provision of

the Fire Act of the province of British Columbia has been in operation for a number of years, and has been working successfully and with decreasing evidences of any friction as the years go by. Recommendations have been submitted and approved that the homestead regulations be amended so as to provide for a permit from a fire ranger being required for the setting out of fire for the clearing of homesteads entered for after the passage of the Order in Council establishing such regulations, which is as far as Dominion legislation can go on the subject. The provinces of Manitoba, Saskatchewan, and Alberta have been considering changes in the Fire Acts to provide a permit system, and the provinces of Manitoba and Saskatchewan passed at the legislative session of 1917 the necessary legislation which, with proper co-operation between the Dominion and provincial authorities in the administration of the Act, should prove effective.

The relation between the forests and settlement is a question involving many interests, and is one not easy of solution. The need for land for settlement after the war will make it necessary to devote every possible piece of land to agricultural purposes, but on the other hand the financial demands for the war will make it advisable and necessary to protect the public forest property, and ensure that the forest on non-agricultural land is retained and brought into best producing condition. As was stated in the report of last year, this is a question which cannot be decided from the point of view of either interest solely, and which shows the necessity of co-operation between the agricultural and forestry interests for the development of an agricultural and forest survey of the country such as will determine the best general lines of development for each district.

The object of a forest policy is not only to perpetuate the forest but to make the products as readily and reasonably available to the consumer as possible, so that they may be most useful in the building up of the districts to which the forest is tributary. The permit system, under which a settler is given the right, at first free and later on payment of reasonable dues, to take timber and wood from the forest for his own use, was adopted for the purpose of enabling the consumer to get his wood supplies directly. Under this system the intention (and the actual practice in the early days of settlement) was that the settler should go into the forest and cut his own wood and timber. As the timber becomes scarcer and less accessible the difficulty of the settler getting out his own timber becomes much greater, and in some cases such a method is practically impossible. In order to preserve the direct right of the settler to timber through the permit system, even in such circumstances, an arrangement has been tried in the past few years by which the right to locate a saw-mill on a forest reserve where there is a quantity of timber is put up for tender, on the basis of the charge to be made the settlers for logging and sawing the timber they obtain under permit. This assists the settlers in two directions. It makes it possible for them to have their logs sawn in the locality where they are obtained, so that all they have to draw out to the settlement is the sawn lumber, and it provides that the logging and sawing shall be done for them at the lowest possible rate. This system is being tried on several of the forest reserves and gives prospects of working out successfully.

Scientific research in the forest to ascertain the conditions that affect the development of the forests has been found a necessity to ensure proper methods of management in every country where forest administration on a permanent basis has been provided for. This necessity is being felt in Canada, and the advisory committee which has been formed in connection with this branch has been giving the question consideration. The war conditions, preventing new appointments or expenditures, have, however, made it impossible to take steps toward any definite programme of investigations. The committee, however, prepared a memorandum for submission to the newly appointed Dominion Council for Scientific and Industrial Research, point-

ing out the great need for organizing forest research work in Canada. It may be permissible to quote the following paragraphs from this memorandum:—

"Ignorance, lack of definite information, opinions rather than knowledge of facts have characterized, and still to a large extent continue to characterize, the methods of handling the forest resources of the Dominion to their detriment and loss.

"Before any rational policy for the management of our timberlands can be put into operation two things at least must be determined, namely, the available supply of sawlog and pulpwood material, and the rate at which the commercial species are reproducing themselves.

"It is ignorance as to extent and character of these resources which has led governments and private owners to treat their forests like mines instead of like crops, administering timberlands rather than managing forests under forestry practice for a sustained yield.

"Such ignorance can of course be removed only by systematic investigation or research.

"There is still abroad, even in authoritative quarters, a good deal of talk of 'inexhaustible timber resources' and especially are extravagant opinions afloat regarding pulpwood supplies. As a result of this loose talk propositions for a more conservative management find only lukewarm reception. Undoubtedly for some time to come if the demand does not increase unduly the timber and pulpwood supplies of the Dominion will be ample to meet the demand. But with growing demand the time of exhaustion of virgin supplies is drawing nearer, and if it is realized that Canada's timber wealth could not supply the present saw-mill capacity of our neighbours for fifteen or twenty years the inexhaustibility phrase should be dropped.

"It should be understood that there is only one way of keeping the forest resource inexhaustible, namely, by means of reproduction.

"We know next to nothing as to whether, and to what extent, the cut-over lands are reproducing the timber that has been removed, still less at what rate such new crop is growing.

"General principles of silviculture can be imported from Europe and, in so far as the same species occur in Canada that are found in the United States, we can profit to some extent from the work of their foresters; finally, however, climatic and soil differences make it necessary to learn how to manage the species under their home conditions. We have in Canada not yet undertaken the first systematic study of the biology of any of our species, a knowledge fundamental to its silviculture.. This is to be accomplished by observation in the field and by a systematic location of permanent sample plots placed under different treatment and observed periodically.

"As regards increment, the rate of production that may be expected from our species under varying conditions, we are also lacking in knowledge. There are neither volume tables as aids for timber estimating nor growth or yield tables as bases for calculating the results of our silviculture in existence. Meanwhile, truly foolish ideas prevail regarding the rate of growth of forest trees and forest acres. A correction of these ideas through systematic measurements will bring the wholesome realization that the replacement of our cut timber takes many more years than is generally believed. We may add that these investigations are most urgently needed for the species of the eastern provinces, which have already been largely exploited and where recuperative measures should be applied at once."

It is understood that the Council for Scientific and Industrial Research have considered the matter of such importance as to recommend its being given early consideration in the programme of research to be carried out in Canada.

The carrying on of forest research will involve co-operation with the provincial forest services so as to prevent unnecessary overlapping and to ensure the carrying on of the investigations in the most efficient way. The urgency of the general administrative and protection work of the forest services has not allowed much time for scientific investigation, but the necessity for it is being felt and any action in that direction can be assured of the co-operation of the provincial authorities.

The province of British Columbia has a well organized forest service which has administrative and protection work well in hand. It has also initiated some special scientific investigations and, as its staff is now appointed entirely under civil service rules and includes a number of specially well qualified foresters, it should be in a favourable position to co-operate in scientific investigation.

The province of Ontario is undertaking a reorganization of its protective and administrative work which will absorb the energies of its forest service for some time to come. The smallness of the technical staff also makes it difficult to organize investigative work, although the enlistment of the staff of the provincial forest school in this work would materially assist in its development. Ontario presents some of the most interesting problems of forest administration to be found in Canada and has proceeded so far in forest exploitation that the necessity for determining the scientific basis of forest management is becoming a pressing question.

The province of Quebec from the first organization of its forest service recognized the necessity for technical training, and provided the nucleus for a technical staff by having two foresters take special courses in forest schools in the United States and in France. This was followed later by the establishment of a forest school in connection with Laval University. This province is, therefore, in a good situation to co-operate in any general plan for forest investigations that may be laid out.

The province of New Brunswick has had until recently no technical forestry staff, and has considered in its administration only the revenue and protective sides. The recent organization of a forest survey of the province, and the employment of a staff of technical foresters in connection therewith, will probably result in the establishment of a forest service with sufficient of a technical staff to make possible the undertaking of scientific investigations in a definite way. The forest school in connection with the provincial university will also be able to render valuable assistance.

The province of Nova Scotia is in the difficult position of having alienated all but a small proportion of the forest lands, and consequently has not organized a special forest service, nor is it to be expected that that province will be able to provide a technical staff for forest investigations. It is probable that forest investigations in Nova Scotia will have to be largely provided for otherwise.

The increasing complexity of the work to be dealt with emphasizes the necessity for having the men employed in the forest service specially trained in the principles of forestry. While the forest schools now in existence in Canada can supply the men with the higher technical training there is no educational institution giving the training required for the position of forest ranger, and the want of such training is felt in many ways. The forest rangers in the employ of the department are given instruction in forestry principles as opportunity permits, but such instruction should be given on a more systematic basis. Assurance of permanency in the position of forest ranger would encourage greatly the disposition of the rangers to qualify themselves for better work and, with a standard of qualifications for appointment based on the character of the work required, would make one of the absolutely necessary forward steps toward a forest management adequate to the situation and creditable to the Dominion.

It may be advisable and necessary at the present time to point out the general plan which is being followed in the forest surveys which are being carried on. At the inception of the Dominion forestry work in the West the plan of intensive surveys was first adopted, surveys which would give accurate information in regard to the forest,

its quantity, condition, etc., so that data on the subject would be complete. It was quickly realized, however, that such a policy was very costly; it gave complete information that would not be required for many years, and owing to the change in conditions later, particularly as a result of forest fires, much of the information was rendered useless for practical purposes. The policy of surveys was, therefore, carefully reviewed at that time and the general plan which is now being followed was determined on.

According to this plan the forest surveys that are being carried on are of three main classes.

The first class is the general reconnaissance or exploratory survey to ascertain where the main bodies of timber are located, their general quantity and condition, and the tracts that are non-agricultural and should be permanently kept in forest. Such a survey can be carried out quickly and at small cost. The average cost per square mile of such surveys, so far carried out, is sixty cents. The greater part of the surveys now being carried on are of this character. They have covered the larger portion of the woodlands under Dominion jurisdiction, and if continued in the same way for three or four years more will cover the whole of such territory. Such surveys make it possible to determine the lands that should be included in forest reserves and to plan the protective organization for the whole timber-bearing area.

The second class of forest survey is that made after forest reserves have been established to obtain the exact location and stand of bodies of timber, the areas reproducing naturally, and generally, the data necessary for planning the management of the reserve so as to provide for the best production. Surveys of this kind are dependent on the land surveys in the district being sufficiently far advanced to give reasonably accurate locations and permit of correct mapping. The land surveys may be either rectangular or topographical, but on many of the reserves they have not been completed sufficiently to make it possible to carry out the forest surveys properly. In consequence of this and the smallness of the staff in this branch qualified to make such surveys progress with this class of survey is not far advanced, though it is important that such surveys should be pushed forward as rapidly as possible.

The third class of forest survey is one made with the object of obtaining information for commerical exploitation. Such surveys ascertain carefully the quantity of timber, its conditions, the relation of species, accessibility, conditions that affect operations, and anything that may affect the commercial possibilities in connection with the particular area or district. Such surveys are being made only on such special tracts of timber as are applied for for commercial purposes, which form as yet but a small proportion of the area of woodlands. Surveys of this character require considerable time and expenditure, and are being undertaken only so far as commercial development demands.

The provinces are following the same general lines in their forest surveys, but in most cases they have not yet been organized on a systematic basis. A general reconnaissance survey of Nova Scotia was made by the Provincial Government, which gave valuable information as to the present stand and condition of the forests of that province. Similar studies of the provinces of British Columbia and Saskatchewan have been made by the Dominion Commission of Conservation in co-operation with the Dominion and provincial forest services. A similar survey of a somewhat more intensive nature is now being carried out by the province of New Brunswick. Beyond these the main forest surveys that have been made are of particular tracts that have been sold or are being put up for sale.

It will be seen, therefore, that the forest surveys are being developed on the line of first obtaining general information as a basis of general organization and management, and gradually intensifying the surveys as they can be made most economically and efficiently, as commercial development requires, and as increased expenditure becomes possible.

For commercial development, therefore, the information now available can only be depended on in a general way, and special surveys of a more intensive nature will be required when it is desired to determine the commercial feasibility of any proposed operations or of the development of any district.

Reforestation was begun on several of the forest reserves in the prairie districts during the year, and sufficient planting was done to make a fair experiment. The reserves on which planting was done are tracts of almost pure sand on which the main tree growth is poplar of small size and poor character. Plantations were made of Scotch pine, jack pine, and spruce, and, with the exception of one reserve, the success is all that could be expected. The importance to the prairie districts of the rapid development of this work cannot be overestimated, and it is hoped that it can be pushed forward steadily each year till the reforestation of these small but important reserves is completed.

At the request of the Home-Grown Timber Committee of the British Isles arrangements are being made for the collection of forest tree seeds of Canadian species for reforestation work in Great Britain. Samples of Canadian tree seeds for trial in China have also been supplied to the Agricultural College at Nanking.

As production of food supplies is an important duty at the present time it is pleasing to note that the number of live stock being grazed on the forest reserves has considerably increased, and the possibility of obtaining summer grazing and hay on the forest reserves has undoubtedly encouraged a number of farmers in the vicinity of the reserves to begin the establishment of herds. It may be expected that the business will develop to large proportions as there are considerable areas of grass land on the forest reserves which will not be reforested naturally or artificially for many years to come, and some not at any time. The forests in Europe, in most places, furnish grazing for large numbers of stock in open meadows or among the trees, and it may be expected that large numbers of stock will always be carried on the forest reserves in the West.

STAFF.

The total permanent staff of the branch for the past year was as follows:—

Head office	40
District inspectors	5
Assistant inspectors and forest supervisors	12
Forest assistants	11
Forest rangers	88
Chief fire rangers	10
Inspectors of tree planting	9
Forest Products Laboratories (technical staff)	19
Outside clerical staff	35
On military leave	36
Total	265

APPROPRIATION.

The appropriation for the year was $750,000.
The expenditure was divided as follows:—

Salaries at head office	$ 14,224 82
Salaries of officials on military leave	13,551 27
Travelling expenses	1,086 92
Printing and stationery	7,956 39
Miscellaneous expenses at head offi e	4,561 63
Statistics	2,898 75
Forest surveys	11,744 40
Fire-ranging	192,089 89
Forest rese:ves	357,827 29
Tree plant ng	56,536 58
Forest Products Laboratories	48,725 47
War appropriation	10,720 00
Total	$721,923 41

(NOTE.—The item of $10,720 shown under "War appropriation" was drawn from the Forestry appropriat'on and later refunded.)

The field expenditure, exclusive of tree planting on the prairie farms, is divided as follows among the provinces:—

Manitoba	$ 91,266 92
Saskatchewan	150,778 46
Alberta	202,285 69
British Columbia (Railway Belt)	117,330 51
Total	$561,661 58

CORRESPONDENCE.

The letters received and sent out by this branch were as follows: Number of letters received, 19,684; mail sent out, letters, circulars, etc., 35,407; bulletins and reports, 21,866; parcels, 256; total, 57,529.

LIBRARY.

During the year 29 books and 327 pamphlets were added to the library at the head office. Seventy magazines have been received during the year, 46 by subscription and the remainder by exchange. A question that is receiving attention is that of the maintenance of branch libraries at the offices of the various inspectors. The number of photographs received during the year is almost 1,400, a slight decrease compared with the number received during the year previous. The matter of the preparation of lectures, illustrated by lantern slides, has received considerable attention during the year. It is hoped in this way to bring the forestry work before the people of the western provinces, especially those living in the neighbourhood of the various reserves, thus drawing their attention to the necessity of it and enlisting their sympathetic co-operation in its accomplishment.

PUBLICATIONS.

The policy of reviewing the manuscript of every publication issued with the view of adapting it as closely as possible to the object for which it is intended has resulted, it is believed, in increased publicity at reduced cost. There has been a steady demand for the publications of the branch, which shows that the public is becoming aware of the technical and commercial information therein contained. Canadian newspapers, as in former years, continued to give great assistance in explaining what the branch is doing and in warning against forest fires.

One of the most effective methods of fire prevention is the posting up of notices warning all who use the forests of the need of care with fire. In the past these have been printed on a prepared linen called buckram, manufactured in Great Britain. The war has greatly reduced the supply and increased the cost of this material. The branch is, therefore, making tests of other material such as tough paper, galvanized iron, boards, and unbleached cotton. It is believed that with these new materials the branch will be able to produce more effective signs at a smaller cost.

During the year the following publications, in pamphlet form, were issued:—

Bulletin 56. Forest Products of Canada, 1914: Lumber, Lath and Shingles.
" 57. " " " 1914: (Being Bulletins 54, 55, and 56.)
" 57. " " " 1914: (French Edition.)
" 58a. " " " 1915: Lumber, Lath and Shingles.
" 58b. " " " 1915: Pulpwood.
" 58c. " " " 1915: Poles and Cross-ties.
" 58. " " " 1915: (Being a Combination of Bulletins 58a, 58b, 58c.)
" 59. Canadian Woods for Structural Timbers.
Circular 1. General Suggestions for the Preparation of the Soil for Tree Planting. (Reprint.)
" 3. Government Co-operation in Forest Tree Planting. (Reprint.)
Dominion Forest Officers' Manual: "Property."
Regulations for Dominion Forest Reserves.

STATISTICS.

The most notable feature of the statistical work of the branch has been the increased demand from manufacturers, firms located outside of Canada, and others, for special information regarding different features of the forest products industry. This indicates both an increased effort to secure special wood materials in Canada and a more widespread knowledge of the work of the branch in this particular.

The provinces of Quebec and British Columbia co-operated with the branch and collected the statistics of lumber and shingle mills within their borders.

The figures for the main items in the forest products industries show that, despite the changes introduced by the war, these industries operated with remarkable steadiness. The falling off in lumber was compensated for by increases in pulpwood and in ties and poles. The total value of lumber, lath, and shingles produced in Canada in 1916 was $66,072,222; of pulpwood, $19,971,127; of poles purchased in Canada, $427,154; and of cross-ties purchased in Canada, $3,307,319. The proportion of pulpwood manufactured into pulp in Canada is steadily gaining upon that exported in the raw state. In 1916, 62·3 per cent of Canadian pulpwood was made into pulp in this country as against 37·7 per cent exported in the raw state to be manufactured abroad. Of air-dry pulp, approximately 1,296,084 tons were manufactured in Canada in 1916.

The following is an estimate, from the information available, of the total value of forest products in Canada during the calendar year 1916:—

Lumber, lath, and shingles	$ 66,075,000
Firewood	62,000,000
Pulpwood	19,975,000
Fence-posts and rails	8,600,000
Cross-ties	3,750,000
Square timber exported	185,000
Cooperage	1,250,000
Poles	575,000
Logs exported	850,000
Tanning materials	140,000
Round mining timbers	750,000
Miscellaneous exports	280,000
" products	9,000,000
Total	$172,830,000

TREE PLANTING.

The demand for trees for planting on prairie farms was somewhat less during the past year, owing to labour conditions and other factors unfavourable to the undertaking of additional work by the farmers. This has, however, not had an unfavourable result, as it made it possible to give a larger number of trees to each farmer, which thus enabled him to start a plantation which would furnish more adequate shelter. The plantations are generally well established and growing satisfactorily, and have demonstrated finally that the growing of trees on the prairie is merely a question of proper preparation and care. The number of trees distributed in the spring of 1917 was 7,664,925, as compared with 4,618,800 in the spring of 1916.

Stock for reforestation by planting on the Dundurn, Elbow, and Manito reserves was provided from the nursery at Indian Head, and provision is being made for growing supplies for further extension of the work.

The permanent plantations at the forest nursery station were established partly for the purpose of giving shelter to the nursery beds and partly to obtain information in regard to the rates of growth of different species and their relations in mixture, Careful measurements of these plantations are taken annually, and much useful information is being obtained that will be of great value for guidance in reforestation and forest management in the future.

FIRES.

The season of 1916 was very much safer throughout than the average season. In the Railway Belt of British Columbia the driest period occurred in August but was of short duration and was preceded by an exceptionally heavy rainfall in July. In the provinces of Manitoba, Saskatchewan, and Alberta the temperature in March and April was high, and some fires occurred in May. Comparatively heavy rains in the latter part of the month reduced the danger and continued throughout the remainder of the season, so that altogether there were fewer fires than in either of the two previous seasons.

The total number of fires reported during the year was 891, as compared with 1,455 in 1915 and 1,986 in 1914. The number of these fires that burned over an area of ten acres or more was 146, as compared with 343 in 1915 and 388 in 1914. The percentages of the total number of fires started that burned ten acres or over were 16 per cent in 1916, 24 per cent in 1915, and 20 per cent in 1914.

The total area burned over was 116,310 acres. Of that area 2,000 acres were classed as merchantable timber, on which there were 4,608,000 feet board measure; 4,340 acres as cordwood, bearing 57,664 cords; and 20,684 acres as young growth. The average area of the fires spreading beyond ten acres was 796 acres, compared with 3,932 acres in 1915 and 1,804 acres in 1914.

The causes of fires were as indicated in the table hereunder. The number of fires is shown for 1916 only, but the percentage due to each cause is shown for the last three years for purposes of comparison.

	Number of Fires.	Percentages. 1916.	1915.	1914.
Unknown	270	30	30	41
Campers and travellers	179	20	33	14
Settlers	167	18	14	24
Railways	174	20	13	13
Lightning	59	7	4	4
Lumbering	30	3	2	1
Incendiary	5	1	1	1
Brush disposal (other than by settlers)	....	....	1	....
Other causes	7	1	2	2
Totals	891	100	100	100

The fire record and the statement of causes again emphasizes the necessity for public education on the subject. In spite of attention having been called to the subject all over the country by various means there are still hundreds of fires occurring every year due mainly to carelessness. The campaign of education is being carried on steadily through the press, through public lectures, through the public schools, and in various other ways. The public schools have been visited by officials of the Forestry Branch and talks given on the fire danger, the matter being emphasized by the presentation to the pupils of articles such as wooden rulers on which are printed mottoes impressing the lesson.

FIRES AND RAILWAYS.

The patrol of the privately owned railways, which form the greater part of the mileage in the West, is carried out by the railway companies under the orders of the Dominion Board of Railway Commissioners, subject to inspection by the officers of this branch. On the publicly owned railways, consisting of a portion of the Transcontinental railway and the Hudson Bay railway, the whole responsibility for patrol and inspection has had to be assumed by this branch. One permanent inspector and eight temporary inspectors were employed in this work. The railway companies generally have co-operated well in the protection work and the results have been good. The Edmonton, Dunvegan and British Columbia railway is the only one against which any serious complaint has been necessary. Out of a total of 174 fires charged against railways this line has a total of 66. Locomotives were carefully inspected from time to time and out of 442 inspections made 36 locomotives were found defective. Of these 17 were on the Canadian Pacific railway and 10 on the Edmonton, Dunvegan and British Columbia railway.

On the government-owned railways conditions were considerably improved over the previous year owing to better co-operation on the Hudson Bay railway. Both the engineers in charge and the contractors have worked with the inspectors of the Forestry Branch to improve the protection, and the result showed only 1,640 acres burned over along this railway line last year as against one million acres the previous year.

Some difficulty is experienced with railways chartered by the provinces which do not come under the jurisdiction of the Dominion Board of Railway Commissioners or under Dominion jurisdiction in any way.

FOREST RESERVES.

The area included in forest reserves is 23,024,640 acres, and the permanent staff employed thereon is as follows: district inspectors, 4; supervisors, 12; forest assistants, 11; forest rangers, 88; total, 115. For the area to be managed the permanent staff is small, but the work required in winter is not great and the improvement and fire patrol work in the summer is carried out with the assistance of a temporary staff of rangers, of whom 57 were employed last year. A good proportion of the rangers have done their work well, but until there is some plan of selection on qualifications, and permanency of tenure of office based on merit, the organization cannot be placed on an efficient and satisfactory basis, or have that degree of permanency which long-time management like that of the forest requires.

Improvements.—Considerable improvement work was carried out during the past year, and was on the whole done satisfactorily and at reasonable cost. Following is a statement of the improvements completed during the year with the total and average cost, including the cost of labour by forest rangers:—

Class of Improvements—			Total.	Average.
Cabins	Number.	34	$ 9,832	$ 289
Houses	"	12	13,144	1,095
Lookout towers	"	8	1,039	130
Stables	"	23	6,430	280
Other buildings	"	7	895	128
Bridges	"	2	693	346
Telephone lines	Miles.	122	12,475	102
Fireguards ploughed	"	156	1,241	8
" cleared	"	50	2,332	47
Roads	"	96	9,426	98
Trails	"	418	29,226	70
Miscellaneous projects such as fences, etc			4,787	
Total			$91,520	

The proper planning of the system of communications in the forest reserves is being given careful attention and has been done pretty thoroughly for all of the older reserves, though the completion of the work of construction will take some years yet to accomplish. A study is being made of methods of construction of forest telephone lines and their use and of other methods of transmitting information, with the object of preparing a manual for the instruction of the forest officers. An immense amount of improvement work remains to be done on the newer forest reserves and in the tracts recommended to be set apart for that purpose.

Timber Operations.—For several reasons, including a scarcity of coal, there was more demand for wood from the forest reserves during the past season. The winter was a severe one and there was heavy snow which interfered somewhat with operations, but the demand for lumber was good enough to encourage considerable activity. The number of permits issued was 2,973 and the quantity cut thereunder was 4,549,215 feet board measure, 37,313 cords, 615,917 lineal feet, besides other products. The number of free permits was 1,657. Ten millsite locations for cutting under settlers' permits were granted and have proved a great convenience in every way. The further concentration of the cutting under settlers' permits has enabled better supervision, with the result that more efficient methods have been followed and brush disposal has been carried out more thoroughly. The owners of the mills understand better the requirements of the regulations and are following them more closely.

Operations were carried on during the past year on 22 sales, 10 of which were made during the past year. The cut of timber was 4,227,751 feet board measure, and of mine props, 460,240 lineal feet.

These sales are made to meet local requirements for timber supplies, and in the Rocky mountains in particular are made mainly to coal-mining companies. It is of the utmost importance that a supply of mine timber should be conveniently and readily available for coal operations, and through small areas this is accomplished, though it may be pointed out incidentally that, as a result of fires, there is but a small area of timber convenient to some of the coal mines in the more accessible districts. On these sales the method of operations is steadily improving. Where the operation is in green timber a selection is made of trees that should be left to produce seed for the reproduction of the forest, and the selected trees are marked for that purpose. The disposal of the débris of operations has been good and is steadily improving, and will soon develop into a well-established practice. The cost is still in many cases higher than necessary, owing to poor organization or bad methods. The quality of labour also adds to the cost as it is difficult to get good men, and brush disposal requires intelligence if it is to be done properly and at a reasonable cost.

Fires.—There were only 43 fires in the forest reserves as compared with 205 in 1915 and 408 in 1914, both of the latter years being, of course, very dry. Seventeen of the fires (40 per cent) burned 10 acres or more, covering a total area of 18,628 acres, of which 122 acres were merchantable timber, 970 acres cordwood, and 340 acres young growth. The greater part of the burned area was grass lands.

The proportion of fires due to various causes differs somewhat from that obtaining in fires on the lands outside the reserves.

Causes.	No. of Fires.	Percentage.		
		1916.	1915.	1914.
Unknown	15	35	35	41
Campers	7	17	21	9
Settlers	6	14	24	17
Railways	7	17	9	29
Lightning	2	4	2	1
Lumbering	4	9		
Incendiary	1	2	6	1
Brush disposal (other than by settlers)			2	
Other causes	1	2	1	2
Total	43	100	100	100

Surveys.—A reconnaissance survey was carried out on the Porcupine forest reserve in Saskatchewan to obtain fuller information in regard to the general conditions in the interior, which had not previously been examined. The result was to show, as usual, that owing to fires the area of merchantable timber is a small percentage of the whole. Information was obtained that will be useful in the planning of the improvements necesssary for the protection of the reserve.

Surveys for the marking of boundaries were also carried out on the Porcupine Hills and Cooking Lake forest reserves in Alberta.

Grazing.—The total number of stock grazed on the forest reserves was 17,147, of which 14,569 were cattle and 2,578 were horses. This is an increase over the previous year and the use of the grazing areas in the reserves may be expected to increase steadily. On the reserves in the prairie districts the fencing of areas for grazing purposes has been found to work satisfactorily. In two cases on smaller reserves in the province of Manitoba the plan has been tried of having the department erect the fence and assume the main responsibilities. In most cases, however, the fences are erected by stock associations or individuals who assume all responsibility for looking after the stock. In such cases, however, the fences become the property of the Crown. It is probable that the latter plan will be most generally followed, although the former may turn out to be the better in special circumstances. Grazing will assist to a great extent in reducing the fire danger and, where properly regulated, in getting the lands into condition for forest planting where it is desired to have reforestation carried out.

There were practically no sheep grazed on the forest reserves last year, although in some parts of the Rocky Mountains forest reserve a large number of sheep could be accommodated. There are certain difficulties inherent in sheep grazing which have yet to be overcome. These difficulties are receiving consideration, and it is hoped that the coming season will witness a beginning in sheep grazing on a sound basis.

Acting in accordance with information obtained from an investigation of the forage plants on the Crowsnest forest reserve, by an agrostologist of the Department of Agriculture, changes were made in the grazing periods in certain districts where

losses of cattle had occurred due to poisonous weeds, and, by keeping the cattle off the range during the time when these weeds were dangerous, losses from this cause were reduced to a minimum.

The grazing regulations have not been applied as yet in British Columbia except in regard to certain meadows designated "project meadows," which are situated in more inaccessible parts of the forest reserves which can now be reached by trails recently constructed. Special regulations have been established for dealing with such meadows, which it is hoped will result in their useful development.

Grazing on the forest reserves is developing so steadily and as the reserves become stocked to capacity will present so many problems, such as determining grazing capacity, improving range, etc., that a specially qualified man will be required for investigation and inspection work in connection therewith.

Fish.—The fishing provisions of the forest reserves regulations have been based upon those designed by the Fisheries Branch of the Department of the Naval Service for the different provinces in which the forest reserves are situated. The object has been, first, to take advantage of the expert knowledge at the command of the Fisheries Branch, in the interests of the protection of the fishing; and second, to save the public the inconvenience of finding two different sets of fishing regulations in the same province. The forest reserves fishing regulations vary from the regulations of the Fisheries Branch only in such particulars as are called for by local conditions. The regulations have been found to work smoothly during the past year, and the arrangement by which a fishing permit, issued either under the forest reserves regulations or under the Dominion Fisheries regulations, is good for all waters in the province has been found to give general satisfaction. In the more northerly parts of the provinces of Manitoba, Saskatchewan, and Alberta, where a number of forest reserves have been established which contain large bodies of water, domestic and game fishing has been carried on for years past under the Dominion Fisheries regulations. It was arranged that such fishing should be continued under the same regulations and supervision, and this arrangement has also worked satisfactorily.

On lake Max and other waters in the Turtle Mountain forest reserve, where the fishing has been one of the most attractive features, large numbers of fish were found dead in the early spring of 1916. While the cause has not been definitely established a sample of the water was found upon analysis to be strongly alkaline, due probably to the lack of rain which resulted in these naturally somewhat alkaline waters becoming unduly charged with alkaline matter. This condition was pronounced by experts to be inimical to fish life, but a contributing cause was doubtless the very heavy fall of snow which came immediately after the lakes froze and excluded the air. Last winter conditions were different. Fish were observed during the winter at the water holes and no fish were found dead in the spring.

On lake Madge, in the Duck Mountain reserve, some of the pickerel with which the lake was stocked two years ago were taken but were returned to the water. The success of the stocking experiment is thus established.

The construction of roads and trails in the forest reserves is having an appreciable effect on sport fishing, as new bodies of water are thereby rendered more easily accessible to the exploratory instincts of the fisherman. This applies with equal force to the game hunter and to the nature lover.

Game.—A change has been made by the Manitoba Government in the Riding Mountain game preserve by the withdrawal therefrom of approximately four townships. The game preserve has now an area equal to six townships.

Efforts are being continued, in co-operation with the Department of Indian Affairs, towards the removal of certain Stony Indians who have located on the North Saskatchewan river in the Rocky Mountains forest reserve. Reference was made last year to the importance of this step in the interests of game protection. The task presents considerable difficulty, but the indications are that it will ultimately be accomplished.

Some years ago a number of half-breeds removed from Jasper Park and squatted on lands in the vicinity of Grand Cache, in the Athabaska division of the Rocky Mountains forest reserve. These people are inveterate game hunters and it was feared that their continued occupation would result in the rapid extinction of the game in that district. Steps were, therefore, taken to secure the removal of these half-breeds. The question was the subject of some correspondence with the Alberta Government, in which authority the property rights in the game of the province are vested. The provincial authorities did not consider that the protection of game was of sufficient importance to warrant taking the action proposed, and under the circumstances no further action for the removal of the half-breeds has been taken. The forest officers will, however, while having no executive authority as provincial game officers, continue to co-operate as far as possible with the provincial authorities in the matter of game protection.

FIRE-RANGING.

The area actually included in the districts of fire rangers outside the forest reserves was approximately 132,000,000 acres in the provinces of Manitoba, Saskatchewan, and Alberta, and 6,000,000 acres in the Railway Belt of British Columbia. There were 126 patrol districts in the former region having an average area of 1,047,000 acres, and 58 patrol districts of an average area of 107,000 acres in the latter. In Manitoba, Saskatchewan, and Alberta about half the fire rangers have assistants, especially where the patrol is carried out in canoes. The enormous area of patrol districts in that region means that the fire rangers must be concentrated along the edge of the forested region adjacent to the settlement where the greatest number of fires start. Farther north only the main routes of travel can be patrolled. In British Columbia the mountainous country, more extensive stands of valuable timber, and more widely distributed settlement throughout the Railway Belt make smaller districts necessary.

The number of fires on Domionion lands outside the forest reserves was 848, as compared to 1,501 in 1915 and 1,567 in 1914. The fires burning ten acres or more numbered 129, 15 per cent of the total number. The total area burned over was 97,682 acres, of which 1,879 acres bore 4,315,000 feet board measure of saw-timber, 3,370 acres bore 18,000 cords of small timber, and 20,344 acres were young growth. The remaining area of 72,089 acres was without either merchantable timber or young growth.

The causes of the fires outside the forest reserves were as follows:—

Causes.	No. of Fires.	Percentage.		
		1916.	1915.	1914.
Unknown	255	30	31	41
Campers	172	20	34	15
Settlers	161	19	13	25
Railways	167	20	14	9
Lightning	57	7	4	5
Lumbering	26	3	2	1
Incendiary	4	*	*	1
Brush disposal (other than by settlers)			*	
Other causes	6	1	1	3
Total	848	100	100	100

* Less than one-half of 1 per cent.

RECONNAISSANCE SURVEYS.

Manitoba.—In Manitoba Mr. L. S. Webb continued the examination of the country east of lake Winnipeg.

An area of approximately 12,500 square miles, from Poplar river northward to township 58 and from lake Winnipeg east to the Ontario boundary, was examined. About 47 per cent of this is muskeg and water, 5 per cent is covered with timber and poles, and 48 per cent has been burned over in the last fifty years. The reproduction on the brulé is fair and is composed chiefly of poplar and jack pine. The country is of the Laurentian formation with numerous pronounced rocky ridges and outcroppings, and is comparatively level; only in a few places are there any hills that rise more than 90 feet above the general level.

The soil is on the whole unsuitable for agricultural purposes, only very small isolated areas of good land being found here and there along the rivers.

White spruce is found chiefly along the banks of rivers and shores of lakes, jack pine occupies the sandy and rocky ridges, and aspen and balsam poplar grow on moderately dry land throughout the area, while stunted tamarack and black spruce are found on the wooded muskegs.

Another party under Mr. J. E. Guay examined the country lying between lake Winnipegosis on the east, the Porcupine forest reserve and the Saskatchewan boundary on the west, township 37 on the south, and township 51 on the north.

This area is very flat and low, and is to a very large extent covered with muskeg. Here and there a low ridge breaks the monotony. A plateau is met with on the Overflowing river. It follows the river from a point about 15 miles east of the Saskatchewan boundary westward towards the Canadian Northern railway.

The soil is, of course, too wet for agricultural purposes.

All this country has been visited by fire several times and very little timber of merchantable size is left. This, composed of spruce, poplar, and fir, occurs chiefly along the slightly elevated river banks and lake shores, and on the plateau mentioned above. Tamarack and black spruce of small size are found on or along the edges of the muskegs. The area examined is 3,500 square miles in extent.

Saskatchewan.—In northern Saskatchewan a party under Mr. G. A. Mulloy examined an area of about 3,750 square miles, bounded on the south by Torch river, on the west by range 22, on the north by township 62, and on the east by range 11.

The western half of the area is a high plateau, while the eastern half is almost level and on that account lacks drainage. It is completely covered with the regular muskeg type of the north—black spruce and tamarack of small size and slow growth—and floating or quaking bog of sphagnum moss with an under-soil of stiff clay.

The western half is on an average of about 800 feet higher in elevation than the muskeg area. The southern portion of it is rather level in character, while the northern part is very hilly. The soil is sandy, sandy clay loam or pure sand of a reddish tint, overlying a very loose gravelly or sandy subsoil.

Of the total area examined, 57 per cent is muskeg, about 29 per cent is covered with timber or poles, 12 per cent is burned with more or less satisfactory reproduction, and the remainder is water.

It is estimated that fires in this district in the last twenty-five years have caused a loss of 2,400,000 cords and 20,000,000 feet board measure of timber. The reproduction on the "burns", however, is quite satisfactory.

White spruce and poplar occur on the well-drained soils, and jack pine covers the sandy ridges. Balsam fir is found in places, mixed with spruce and poplar.

Very little of the land examined is considered to be of agricultural value.

Another party under Mr. J. E. Hall examined or re-examined certain portions of the interior plateau of the Porcupine forest reserves Nos. 1 and 2 in Saskatchewan and Manitoba. In addition to the examination of topographical conditions, soil, and forest cover, several road and trail surveys were made by Mr. Hall.

FOREST PRODUCTS LABORATORIES.

No effort has been made to develop new work in the Forest Products Laboratories owing to the economy, both as regards men and expenditure, required as a result of the war. Further, the staff of the laboratories have been carrying on a certain amount of work in connection with munitions, the superintendent giving practically all his time to inspection work for the Imperial Munitions Board.

Considerable work has been carried on in the divisions organized, and a large amount of useful data in regard to Canadian woods has been compiled from published reports or obtained by direct investigation, so that inquiries in regard to Canadian woods and their comparison with those of other countries, which are becoming increasingly numerous, may be answered as fully as the present development of investigation work generally will permit. Original investigations now under way cover some of the most important fundamental questions in regard to the constitution of wood, and would hardly ever be undertaken by any but government research laboratories. Such an investigation is the one now being carried on in regard to the chemical composition of the principal Canadian pulpwoods, which work is now well advanced and promises to bring out information of the utmost value to the pulp and paper industry.

Nothing in connection with the laboratories is more gratifying than the interest and co-operation of the industries using wood in the work now being carried on at the laboratories. This is particularly exemplified in the pulp and paper industry. The Canadian Pulp and Paper Association, as a whole and individually, have always taken an active interest in the work which is being carried on, and the Advisory Committee appointed by the Technical Section of that association have given a great deal of time and trouble to assist the laboratories in the planning of investigations and the necessary equipment therefor.

The bulletin on "Canadian Woods for Structural Timbers" (Forestry Branch Bulletin No. 59) that was published during the year, was a fair presentation of the value of Canadian timbers for this purpose as compared with timbers of other countries, and has had a wide distribution throughout the Empire and in foreign countries. The information contained in the bulletin was obtained from investigations made at the laboratories and from reports of investigations made elsewhere, but it was considered of importance to Canadian industry to publish the information available without waiting till all the Canadian woods had been thoroughly investigated at the laboratories. From the interest taken in this bulletin it is evident its publication has been timely and has given to prospective customers of Canada in foreign countries reliable information as to the properties of Canadian timbers and the respects in which they show superiority.

An investigation into the production of wood oils for ore flotation, which was undertaken at the request of the Canadian Mining Institute and was carried out in co-operation with the Mines Department, resulted so successfully that it illustrates well the possibilities that scientific investigative work opens up. The Canadian mines were dependent on the United States for their supply of pine oil, which, though not required in large proportions, is an essential ingredient to ensure the proper frothing action necessary to carry out the process of extraction of ore by flotation, and the demand so greatly exceeded the supply that the Canadian mines were likely to be left in a difficult position. The investigation demonstrated that several of the light creosote oils produced from hardwood distillation will successfully take the place of pine oil in the flotation process, and as sufficient of such oils to meet the requirements of the mines is already being produced in Canada the difficulty has been solved for the mines, while an important new use and value has been obtained for a practically waste product of hardwood distillation.

R. H. CAMPBELL,
Director of Forestry.

Statement of Revenue, Fiscal Year 1916-17

Reserve.	Timber Sales.	Timber Permits.	Timber Seizures.	Grazing Permit and Trespass Dues.	Hay Permit and Seizures.	Surface Rental.	Special Uses.	Nursery Stock.	Unclassified.	Total.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Turtle Mountain		108 05		1,214 00	76 90	80 00			157 50	1,636 45
Spruce Woods		33 25		570 00	18 75					622 00
Riding Mountain	705 91	4,997 22	1,302 44	145 10	329 40	49 60	313 35			7,843 02
Duck Mountain		1,706 33	64 53	89 25	177 50	155 00	103 25			2,295 86
Moose Mountain		252 90	87 70	33 75	235 30	55 00	7 78		25 00	697 43
Beaver Hills		39 75		135 00	201 60		0 50			376 85
Porcupine	527 98	807 75	59 42	102 35	97 70		103 55			1,698 75
Pasquia	270 47	1,456 95	26 70		8 00		26 75			1,788 87
Fort à la Corne	371 80	166 80			4 50		0 25			543 35
Pines		172 85	12 50	94 95	54 50					334 80
Nisbet		661 95		17 00	81 85		2 50			763 30
Big River	230 50	8 00	119 33	9 70	70 25		3 50			441 28
Steep Creek		39 60	6 00							45 60
Sturgeon		0 25	50 75		2 25		0 50			53 75
Keppel		185 00		128 40	25 90		0 50			339 80
Manito		91 70		471 95	47 75		4 75			516 15
Dundurn		3 00		257 10	6 20		1 50			267 80
Seward				256 20	58 60		3 25			318 05
Elbow		18 25		614 15	61 65		6 00		45 00	745 05
Cypress Hills	272 28	421 97	2 00		322 45	25 00				1,043 70
Cooking Lake		76 40		54 35	117 35					248 10
Crowsnest	5,284 23	570 67	302 69	2,131 38	31 35	28 40	145 55			8,494 27
Bow River	0 25	116 50	16 00	731 95	74 80	42 79	14 20			996 49
Clearwater	4,524 84	90 25		26 40	16 50	481 04	42 75			5,181 78
Brazeau	1,352 09	406 00	189 29			143 38	55 00			2,145 76
Athabaska				89 25			10 00			99 25
Lesser Slave			23 56				0 75			24 31
British Columbia Reserves	73 54	66 00			12 70	147 40	31 00		4 50	335 14
Indian Head							16 50	1,452 00	1,358 89	2,827 39
Total	13,613 89	12,497 39	2,262 91	7,172 23	2,133 75	1,207 61	893 68	1,452 00	1,590 89	42,824 35

Statement of TIMBER Permits issued on Forest Reserves, Fiscal Year, 1916-17.

Reserve.	No. of Permits.		Kinds and Quantities of Timber Authorized to be Cut.								Dues and Fees.
	Free.	Paid.	Roof Poles.	Fence Rails.	Fence Posts.	Saw Timber.	Mine Timber.	Building Logs.	Green Fuel.	Dry Fuel.	
						Ft. B.M.	Lin. Ft.	Lin. Ft.	Cords.	Cords.	$ cts.
Turtle Mountain	129	15		10	600	14,000		360		3,476	108 05
Spruce Woods	24	16								485	33 25
Riding Mountain	273	465	1,660	500	23,089	2,126,276		56,086	103	5,998	4,997 22
Duck Mountain	89	143		100	8,520	803,800		16,827		3,118	1,706 33
Moose Mountain	49	93	977	375	3,925			4,312	210	1,322	252 90
Beaver Hills	46	3	100	150				3,200		375	39 75
Porcupine	95	25	3,826	24,800	9,950	742,484		3,670		1,228	807 75
Pasquia	24	40	400	6,026	2,500	174,555		13,250	400	4,038	1,456 95
Fort à la Corne	75	45	10,300	59,220	19,028	377,550		10,125		1,818	166 80
Pines	29	32	800	5,500	3,790	39,750		4,945	12	1,020	172 85
Nisbet	49	55	4,800	24,000	9,300	111,000		245		2,233	661 95
Big River	33		3,600	18,500	5,000	95,750		1,600		592	8 00
Steep Creek	16	13	800	4,000	1,565	24,500		210		406	39 60
Keppel	168	69	6,790	8,900	13,775	1,300		71,600	397	1,965	185 00
Sturgeon	1		400	2,000	500	9,250				25	0 25
Elbow	29	17	100		325			500	6	255	18 25
Manito	42	35	3,550	14,885	8,571			14,500	179	671	91 70
Dundurn	12									300	3 00
Cypress Hills	288	130	31,901	11,500	48,765	29,000	1,790	111,765	153	2,252	421 97
Cooking Lake	26	15		50	200			12,180		720	76 40
Crowsnest	90	55	2,620	8,260	7,355		98,468	30,988		1,791	570 67
Bow River	27	19	3,185	4,400	2,650			14,616		561	116 50
Clearwater	24	7					10,000	500		775	90 25
Brazeau	8	11	350				116,500	4,900		279	406 00
British Columbia Reserves	11	13	1,240	1,200	550			12,780		150	66 00
Total	1,657	1,316	80,399	194,376	169,958	4,549,215	226,758	389,159	1,460	35,853	12,497 39

STATEMENT of Grazing Permits issued Fiscal Year 1916-17.

Reserve.	No. of Permits.	Number of Stock.				Dues and fees collected.
		Cattle.	Horses.	Sheep or Hogs.	Total.	
						$ cts.
Turtle Mountain	72	1,093	118		1,211	1,212 00
Riding Mountain	21	497	13		510	132 60
Duck Mountain	9	341	4		345	89 25
Spruce Woods	30	477	19		496	570 00
Moose Mountain	6	129			129	33 75
Porcupine	7	437	59		396	102 35
Pines	8	350	6		356	94 95
Beaver Hills	11	435	30		465	135 00
Nisbet	4	42	21	7	70	17 00
Keppel	35	434	54		488	128 40
Big River	1	42			42	9 70
Manito	53	1,267	253		1,520	468 45
Elbow	92	1,494	390		1,884	505 80
Seward	25	393	143		536	248 75
Dundurn	12	797	113		910	257 10
Crowsnest	66	4,678	721		5,399	2,131 38
Bow River	29	1,431	379		1,810	731 95
Clearwater	3		83		83	26 40
Athabaska	26	46	172		218	89 25
Cooking Lake	6	186			186	48 85
Total	516	14,569	2,578	7	17,054	7,032 93

TIMBER CUT on Forest Reserves under authority of Timber Sales, Fiscal Year 1916-17.

Reserve.	Previous Sales still operating.	Sales made Current Year.	Saw Timber.	Mine Timber.			Dues collected.
				Props.	Props.	Lagging.	
			Ft. B.M.	Ft. B.M.	Lin. Ft.	Cords.	$ cts.
Riding Mountain	1		20,000				60 00
Fort à la Corne		1	65,781				98 67
Big River		1					
Pasquia	1	1	599,041			356	1,026 98
Porcupine	1	1					
Cypress Hills		1	121,220				181 94
Crowsnest	5	4	2,076,375		461,240		3,926 52
Clearwater	1		175,053	422,759		85	1,575 44
Brazeau	2	1	737,902				1,106 84
Fly Hills	1		9,620				7 22
Total	12	10	3,804,992	422,759	461,240	441	7,983 61

Statement showing the quantity of Timber sold and Revenue due during Fiscal Year ending March 31, 1917, on License Timber Berths within Dominion Forest Reserves.

MANITOBA.

Forest Reserve.	Timber Berths.	Area in Reserve.	Quantities Sold.			Revenue.		
			Lumber.	Laths.	Other Products.	Dues Payable.	Rent Payable.	Total Payable.
	No.	Sq. Mls.	Ft. B.M.	No.		$ cts.	$ cts.	$ cts.
Riding Mountain	5	45·43	325,000			148 79	227 15	375 94
Duck Mountain	11	99·98	11,514,252			5,213 66	499 90	5,713 56
Total	16	145·41	11,839,252			5,362 45	727 05	6,089 50

SASKATCHEWAN.

Porcupine and Pasquia	44	960·99	22,296,544			11,599 78	4,886 90	16,486 68
Sturgeon	12	177·78	37,573,287	8,226,500	4,021	16,444 39	891 33	17,335 72
Big River	3	260·77	34,135,316	16,538,150	6,811	12,743 14	1,303 85	14.046 99
Nisbet and Pines	5	116·80			3,004	410 25	173 15	583 15
Total	64	1,516·34	94,005,147	24,764,650	13,836	41,197 56	7,255 23	48,452 54

ALBERTA.

Crowsnest	11	254·94	2,558,766		780,051	2,846 63	1,295 95	4,142 58
Bow River	15	374·44	6,540,403	974,300	4,473	4,793 64	1,860 95	6,654 59
Clearwater	4	377·56					1,887 80	1,887 80
Brazeau	11	177·64			35,307	1,466 70	1,131 30	2,598 00
Total	41	1,184·58	9,099,169	974,300	819,831	9,106 97	6,176 00	15,282 97

BRITISH COLUMBIA.

British Columbia Reserves	11	133·57					667 85	667 85
Grand total	132	2,979·90	114,943,568	25,738,950	833,667	55,666 98	14,826 13	70,492 86

APPENDIX No. 1.

This Report concerns the tree-planting division for the fiscal year 1916-17.

The past season as a whole has been very favourable to nursery and tree-planting work. The spring of 1916 opened much later than usual, following a severe winter with an exceptionally heavy snowfall. The previous autumn left the ground in good condition as regards moisture, and the heavy covering of snow prevented evaporation during the winter and furnished additional moisture following the spring thaws. The soil, therefore, was in excellent condition for all planting operations. On account of the late spring growth was more or less retarded, and very little injury was caused by spring frosts.

The shipping season opened late, packing for the general distribution not commencing until April 25; as compared with April 10, in 1915. The weather, however, was cool and remained favourable during the shipping season. The evergreen shipments were completed by May 15. The growth of all stock in the nursery was excellent. The quality of all seedlings dug in the fall was above the average. The evergreens transplanted from seed beds to nursery rows showed very few losses, and the older transplants made strong growth and will make fine plants for distribution this spring (1917).

On September 10, 1916, digging was started. From that time until the ground froze up the season was the worst we have yet experienced. A continual run of bad weather—snow, rain, frost, mud, and cold winds—made the getting up of the stock a most disagreeable and unpleasant business, so that it was not until November 6 that the digging of the seedling stock was completed. Soil froze up solid on the 8th, so that no further work on the land was possible. We were, therefore, unable to get our usual fall sowing done, the ground being too wet and muddy to operate the seed drill.

The reports received from the inspectors covering the farm plantations are uniformly favourable. The plantations set out in the spring of 1916 made an excellent showing in all districts. All classes of stock, both seedlings and cuttings, gave a very high percentage of live plants. The older plantations made correspondingly good growth and but slight damage has been reported from winter-killing. The poplar leaf-beetle, which was noted in 1915 in certain districts of west central Alberta, apparently was much more in evidence last summer. The territory affected was very much larger and extended well into central Saskatchewan, the beetle being reported as far east as Morse on the main line of the Canadian Pacific Railway and at scattered points even east of Saskatoon. These beetles seem to suddenly appear in millions. Letters from farmers describe them as being so numerous that the sky is literally darkened by enormous clouds of the insects. In about three or four minutes after the beetles strike a plantation every poplar and willow in the belt is absolutely defoliated. Apparently no other varieties, with the exception of currants, are affected. After a few days the beetles disappear and are not seen again during the season. The suddenness with which these attacks occur make it almost impossible to effectually protect the plantations, unless the trees can be thoroughly sprayed with arsenate of lead in anticipation of the invasion. Of course in some cases the beetles are not quite so numerous and then they might possibly be controlled by spraying after the first ones were noticed on the trees. Fortunately, from all reports received, the defoliated trees leaf out again and make more or less growth before fall, but such attacks must necessarily weaken the trees and it is doubtful whether they will be able to survive severe attacks in consecutive seasons. It is to be hoped that some natural control will keep

this insect in check, as it would seem quite impossible at present to guard efficiently against it by any artificial means. When we realize that in the affected parts of Alberta the only broad-leaved trees that we can absolutely rely upon for hardiness for cultivated shelter-belts are different varieties of poplars and willows, it can be seen what serious effects repeated attacks from these leaf-beetles will have on the planting of trees generally in these districts. In Manitoba the fall canker-worm, which works principally on the Manitoba maple, is the only insect reported as at all general, although the area affected is gradually increasing. This caterpillar can be easily controlled if the trees are sprayed with Paris green or arsenate of lead at the proper season. The aphis which did so much damage in 1915 was not in evidence in 1916. In 1914 the larch saw-fly threatened to become a serious pest in the tamarack and larch plantations on the nursery station. These plantations cover in the total approximately 20 acres, and in order to save them roads were cut through at intervals of 40 feet and all the plantations thoroughly sprayed, in 1915, with arsenate of lead as soon as the larvæ were noticed at work. This spraying appears to have been at least temporarily effective as not a single specimen could be found in any of the plantations during the past season.

In my last report mention was made of an arrangement arrived at with the Saskatchewan Provincial Department of Education to encourage tree planting on rural school grounds and to more effectively ensure the success of these school plantings. Under this arrangement fifty-five schools will be supplied with trees this spring. As the local school boards become more familiar with the details of this arrangement we may expect to have a very much larger number on our lists next season.

Owing to the present abnormal conditions due to the war it cannot be expected that farmers will be able to devote as much time as in the past to any farm operations that are not directly productive. In referring to Table 1 it will be seen that the number of men receiving trees this spring is approximately 400 less than in 1916. This reduction is due largely to shortage of farm labour, and, again, many of those who applied for trees have since enlisted for overseas service. A great reduction will be noticed in the number of new applications, the difference being something like 1,400. At the same time the available stock has very nearly doubled, so that, instead of an average of 875 trees and cuttings sent out to each individual in 1916, the average this spring will be about 1,675.

Up to 1916 the demands on our stock were becoming almost too heavy for us to take care of, and the average allotment of 875 trees was hardly sufficient to make anything like an efficient shelter-belt, and, in fact, in many cases the individual allotments were quite inadequate. The present falling-off in applications will allow a more generous distribution and will make it possible to furnish enough stock to each individual to enable him to set out a really practical shelter.

TABLE 1.—Annual Distribution of Deciduous Stock.

	1912.	1913.	1914.	1915.	1916.	1917.
Number of applicants receiving trees..	3,618	3,536	3,420	3,459	5,072	4,627[1]
Seedlings and cuttings distributed.....	2,729,135	3,495,375	3,685,455	3,730,375	4,460,600	7,797,125[2]
Average number per applicant.....	626	988	1,077	1,078	875	1,684
Number of applicants on inspection list	7,375	6,987	7,167	9,570	10,275	9,577[1]
Number of new applications received...	1,649	1,899	1,559	3,693	2,853	1,454[2]

[1] Compiled March 19, 1917. Figures will be slightly altered when 1917 lists are completed.

[2] Supplementary to these figures considerable stock will be shipped to the Saskatoon Nursery, Manitoba Education Department, and other Public Institutions.

For inspection purposes the three prairie provinces were divided into nine districts, each one covered by an inspector. The following table shows the number of applicants in each of these districts, number of trees allotted in each district, etc.

TABLE 2.—Distribution of Trees in Relation to Districts, 1917.

District.	Number men on list.	Number to receive trees.	Number trees allotted.	Average number per applicant.
Central and Southern Manitoba	804	272	472,950	1,738
Central Saskatchewan east of Saskatoon	1,077	437	690,925	1,581
Southeastern Saskatchewan	1,228	570	1,174,700	2,061
Northern Manitoba, Saskatchewan and Alberta	1,115	571	833,575	1,459
Southern and Western Alberta	1,283	652	988,600	1,516
Central Alberta	1,275	525	731,950	1,394
Southern and Western Saskatchewan	1,217	477	909,025	1,901
Central Saskatchewan West of Saskatoon	1,140	533	945,725	1 774
" " "	1,136	590	1,049,675	1,779
Total	10,275	4,627	7,797,125	1,684

The following is a statement of the planting plans prepared during the winter and the correspondence handled during the fiscal years 1915-16 and 1916-17:—

Planting plans prepared, fiscal year 1915-16, 4,441; 1916-17, 3,583.

Pieces of mail received, fiscal year 1915-16, 22,076; 1916-17, 18,598.

Pieces of mail sent out, fiscal year 1915-16, 29,536 (including 4,276 plans franked); 1916-17, 26,982 (including 3,574 plans franked).

New files added, fiscal year 1915-16, 4,864; 1916-17, 2,604.

The record of pieces of mail sent out does not include bulletins, these being sent out from the head office at Ottawa.

NURSERY WORK.

For the first time a distribution of stock was made from the new Saskatoon Nursery station at Sutherland. This nursery, located in the outskirts of Saskatoon, is situated so that it can serve all the country to the north of Saskatoon and the main lines and branches running east and west into Manitoba and Alberta; while the Indian Head station covers all shipments in the southern halves of the three provinces. In order to equalize the stocks at these two distribution centres it will generally be necessary to exchange different quantities of certain varieties between the two nurseries. Last spring we, therefore, shipped from Indian Head to Sutherland 1,042,000 seedlings of maple and ash, and from Sutherland to Indian Head 59,000 cuttings of Russian poplar. In 1916 a somewhat larger stock was raised at Sutherland, so that the transfer will not be so heavy from Indian Head this spring.

At Indian Head the following areas were under nursery stock: Maple, 17 acres; one-year ash, 21 acres; two-year ash, 24 acres; conifers, 11 acres; caragana, 8 acres; Russian poplar stock, 6 acres; willow stock, 3 acres; total, 90 acres. In the fall of 1916 we managed to get 11 acres of ash sown, but no caragana or maple.

At the Saskatoon station the areas under nursery stock were as follows: Maple, 22 acres; one-year ash, 21 acres; two-year ash, 20 acres; caragana, 5 acres; Russian poplar stock, 2 acres; willow, 3 acres; total, 73 acres.

Owing to rather inadequate shelter, the plots at Sutherland suffered some setbacks because of drifting soil, and the ash was badly damaged from summer frosts, so that the output of ash seedlings is very small compared to the average.

Stock available for distribution in 1917:—

At Indian Head—		
Maple seedlings	1,617,325	
Ash seedlings	1,297,000	
Caragana seedlings	764,000	
Willow cuttings	474,375	
Russian poplar cuttings	344,800	
Total		4,497,500
At Sutherland—		
Maple seedlings	2,031,000	
Ash seedlings	67,000	
Caragana seedlings	552,000	
Willow cuttings	1,247,000	
Russian poplar cuttings	487,000	
Total		4,384,000
Total of broad-leaved stock		8,881,500
To these may be added the following conifers from Indian Head—		
Scotch pine, 4-year transplants	13,800	
Jack pine, 4-year transplants	43,200	
Lodgepole pine, 4- and 5-year transplants	32,200	
White spruce, 5-year transplants	115,500	
Total		204,700
Grand total		9,086,200

Collection of seed.—From the seed collector's standpoint 1916 was a comparatively good seed year for ash but poor for other varieties, the very unfavourable fall weather making collections very difficult. The following were collected: Caragana, collected on Indian Head nursery, 325 pounds; ash, collected in Qu'Appelle valley, about 4,500 pounds; Scotch pine, collected on Indian Head nursery, 10 bushels of cones—seed extracted, 8½ pounds; Manitoba maple, collected in the nursery and in Qu'Appelle valley, about 1,400 pounds. All seeds used in the Saskatoon nursery have been collected, cleaned, and sent from the Indian Head station.

Conifers.—In the spring of 1916 the following seedlings were set out in nursery rows:—

White spruce, 3-year seedlings	84,268
Scotch pine, 2-year seedlings	47,112
Jack pine, 2-year seedlings	72,264
Lodgepole pine, 2-year seedlings	32,840
Total	237,484

The following were dug and shipped under the usual conditions in the spring of 1916 at a nominal price of $1 per 100; White spruce, five-year transplants, 110,400; jack pine, four-year transplants, 28,100; lodgepole pine, four-year transplants, 17,600; Scotch pine, four-year transplants, 7,600; total, 163,700.

About 2,400 of these were sent to various experimental farms and ranger stations. In all 730 separate shipments were made. In addition to the above the following seedlings and transplants were sent out for planting on the Dundurn, Manito, and Elbow reserves in Saskatchewan: White spruce seedlings, 6,300; white spruce transplants, 2,100; jack pine seedlings, 10,500; Scotch pine seedlings, 6,300; total, 25,200; making the total number of conifers shipped out 188,900.

The reports from the individual planters, in reference to the planting of these evergreens, indicate very general success. In many cases lots of 500 were set out without losing a single plant. Three per cent would cover all losses on the average. Very encouraging reports are also being received on the growth of similar stock sent out in previous seasons. The farmers are beginning to learn from experience that the evergreens are as easy to handle as the broad-leaved varieties, and although somewhat slower growers at the start, they eventually make a more efficient shelter,

especially during the winter. Once these hardy evergreens become established there is practically no danger of winter-killing, and up to the present they appear to be but little subject to any serious insect attacks.

At present under lath-screened seed beds are the following areas:—

	Square Feet.
White spruce, 3-year plants	1,550
" 2 "	3,100
" 1 "	2,400
Scotch pine, 2 "	650
" 1 "	2,400
Jack pine, 2 "	1,850
" 1 "	2,400
Lodgepole pine, 2-year plants	300
Total, exclusive of paths	14,650

The seed of the Scotch pine sown in 1916, as stated in my last report, was extracted from cones collected on the nursery here from trees raised from seed and set out in permanent plantation in 1906 as three-year-old transplants. These trees were in 1916 only 13 years old and we were doubtful as to germination of seed and quality of the seedlings. The resulting stands in the seed beds are practically perfect and the growth of seedlings strong and vigorous. We shall, undoubtedly, from now on be able to secure all the seed of this variety which we are likely to require without going off the nursery. Seed secured in this way is more likely to produce stock suitable for prairie planting than that procured from European sources and of doubtful origin.

PERMANENT PLANTATIONS.

No additions have been made to the permanent plantings since my last report. The growth during the season of 1916 was good. The usual growth measurements were made as in past seasons.

GENERAL FARM WORK.

Owing to pressure of other work no new land was brought under cultivation. Fifty acres of oats, which were, however, about 50 per cent hailed out, furnished grain and straw for the horses. Thirty-five acres were summer-fallowed. Thirty acres were in hay, of which 25 acres were ploughed immediately after cutting. Ten acres of new hay land were sown, and besides this about forty acres of nursery land were ploughed and cultivated after the stock was lifted in the fall.

SASKATOON NURSERY STATION.

The amount of stock grown on this nursery has already been stated. This nursery, located at Sutherland adjoining the city of Saskatoon, is now well established, though shelter-belts and hedges, naturally, will require time for development. Good permanent shelter-belts of conifers have been set out on the east, south, and west sides of the half-section. At present only the south quarter is to be used for nursery plots. These are to be divided from each other by caragana hedges, following practically the same plan which has given such good results on the Indian Head nursery. The main approach to the buildings consists of a well-graded and gravelled road, planted along both sides with wide borders of ornamental shrubs and trees. In front of the superintendent's residence an ample lawn has been laid out, also enclosed by an irregular border planting of trees, shrubs, and perennials. This portion of the grounds has made good progress and has already attracted numerous visitors to the nursery.

A much needed addition to the buildings, in the shape of a roomy boarding-house, was made during the past season and this will help to simplify the labour problem. This nursery could now be considered as thoroughly equipped if adequate water supply can only be secured. The original well, which when sunk gave promise of an abundant supply of water, has since then gradually silted up and proved quite insufficient. Attempts were made to sink deep wells last spring but on account of quicksand and boulders two holes had to be abandoned after drilling to a depth of about 90 feet. Apparently the only reliable supply is to be secured by piping water from the Sutherland water-mains. At present all water for domestic use and most of that required for the stock has to be hauled in tanks from Sutherland. This means a great deal of lost time both for teams and men and is generally rather unsatisfactory.

PLANTING ON THE FOREST RESERVES.

Experimental plantings of 4 acres each were set out on each of the following reserves in Saskatchewan: Elbow, Dundurn, and Manito. The sites for these plantings were selected, so far as possible, in situations typical of the larger areas which must be subsequently planted up.

On the Spruce Woods reserve in Manitoba a more extended planting of some 27 acres was undertaken. The stock for this latter planting was grown entirely on the reserve, in a nursery adjoining the ranger house.

The soil on all these reserves is very similar, being an almost pure sand supporting a very light growth of grass; in places patches of various sizes are grown over with ground cedar which spreads over the surface forming a dense, matted growth from 2 to 6 inches high. The prostrate stems of this cedar are very tough and often 2 inches in diameter, so that it is not practical to plough or cultivate such patches.

The planting was done entirely in plough furrows which run east and west, with the sod thrown to the north, the seedlings being set in the bottom of the furrow and close up to the land side so that they would be more or less shaded. Seedlings were set in wedge-shaped holes made with planting irons, but in handling transplants it was found necessary to dig out holes with spades.

Figures, as accurate as possible, were kept in all cases as to labour cost of these plantings. The small plantings on the three Saskatchewan reserves averaged $11.39 per acre, not including cost of transporting seedlings or the labour of the ranger in charge of the work. The cost of setting out approximately 30 acres on the Spruce Woods reserve is given as $9.93 per acre for seedlings and $20.75 per acre for transplants. This includes the cost of digging in the nurseries and transport to the planting site, which, however, in this case was close at hand. These figures do not include charges for supervision or the ranger's time, except when he was actually doing planting personally. Thus the cost of planting and digging the transplants is double the cost of handling the seedlings, and the cost does not take into account the great expense of transplanting in the nursery, or the larger area of nursery ground required. From the reports this season it would appear that on the small reserves the transplants have shown less loss than the seedlings, but on the Spruce Woods the reverse is the case. This is probably to be accounted for by the fact that the stock sent out from the Indian Head nursery, having been grown on much richer soil, has good compact root systems, whereas the stock grown on the almost pure sand of the Spruce Woods reserve had very thin, straggly roots and consequently gave poorer results. Again, white spruce, which was used on the Saskatchewan reserves, in our experience always transplants with less loss than the pines, which were the only varieties of transplants used on the Spruce Woods.

The composition of each of the four-acre plantations on the Dundurn, Elbow, and Manito reserves was similar. The four acres were divided into eight half-acre plots and these were planted as follows: (1) alternate rows of caragana and Scotch

pine seedlings; (2) Scotch pine seedlings; (3) alternate rows of caragana and jack pine seedlings; (4) alternate rows of caragana and white spruce seedlings; (5) white spruce seedlings; (6) white spruce transplants; (7 and 8) jack pine seedlings.

Reports sent in by rangers in the autumn show fairly good results on the Manito and Dundurn reserves, but not so good for Elbow reserve. As conditions are practically similar on all three it is difficult to account for the comparatively large losses on the latter reserve. The reports are as follow:—

Dundurn reserve: loss covering all varieties, due largely to drifting sand burying the young seedlings, 3 per cent.

Manito reserve: white spruce transplants, no loss; white spruce seedlings, 5 per cent loss; jack pine and Scotch pine seedlings, 3 per cent loss; with some damage due to moles covering up plants.

Elbow reserve: white spruce transplants, 2 per cent loss; jack pine seedlings, 9 per cent loss; white spruce and Scotch pine seedlings, 30 per cent loss.

On the Spruce Woods reserve the following stock was planted:—

Lodgepole pine transplants, 3½ acres, 10,900 plants.
Jack pine transplants, 5½ acres, 15,100 plants.
" and caragana alternate rows, 1½ acres, 1,968 (of each).
" 2-year-old seedlings, 17 acres, 50,100 plants.

An examination of these plantings, made by the district inspector late in June, showed a loss of 1 per cent in the seedlings and 2 per cent in the transplants. A report from the ranger in September is to the effect that the seventeen acres of jack pine seedlings were looking very well, only a very small percentage of the plants had died, due, probably, to the excessive heat. The jack pine and lodgepole pine transplants had done well but showed a loss of probably 10 per cent.

In all the reserve plantings the spacing was, as far as practical, the same in every case. That is, the furrows were run approximately four feet apart and the plants placed about four feet apart in the row.

All the plantings, to date, are of a more or less experimental nature and as yet no definite scheme has been worked out for the more extensive plantings which must be made in future seasons. Before any such planting can be worked out it is first necessary to have a definite knowledge of the portions of the reserve which will require to be planted. A surface survey of each of these reserves will, therefore, have to be made, which should show, when mapped, the general topography such as creeks, sloughs, important elevations, trails, etc., and also the areas at present partially timbered and those entirely bare of trees, which will, of course, be the portions to be first planted. On most of the reserves certain areas are more or less covered with a natural growth of aspen and such deciduous shrubs as are usually found growing with it. The aspen will spread rapidly when given good fire protection, and, as it makes quite a good fuel and is the common wood fuel of the prairies, it may possibly be the best policy to encourage the reproduction of aspen wherever possible, instead of trying to introduce conifers which must be artificially planted. In any event there are large areas on all the reserves which cannot possibly become forested except by artificial methods, and these should receive first attention.

A survey was started on the Manito reserve, but unfortunately was stopped after a few weeks, owing to the man in charge leaving to engage in other work. In all, twenty-seven sections in the northwest corner of the reserve were covered, being in townships 42 and 43, ranges 27 and 28. A map (scale 3 inches to the mile) showing the data obtained was prepared and forwarded to Ottawa.

VIDAL'S POINT PARK.

The public park property, locally known as "Vidal's Point," on the northwest quarter of section 4, township 20, range 12, west of the 2nd meridian, has been under the supervision of the Indian Head office for several seasons. This property com-

prises about twenty acres along the shore of lake Katepwe, the most easterly of the Fishing lakes, a chain of five lakes in the Qu'Appelle valley. This is the only land along the lake shores not held in private hands and, consequently, is largely used by the neighbouring public for camping and picnics. Certain portions of the property were originally well treed, but a great many of the trees were destroyed or damaged by thoughtless campers, principally through the biting away of the bark by horses which were tied to the trees, often for days at a time. Soon after being put under the supervision of this office, in 1911, the property was fenced and a farmer living alongside engaged as caretaker, to see that horses were not allowed to be brought inside the fence and to warn the public generally against injuring trees or shrubs.

When the ground was first fenced it was divided into two portions, one part to be used for camping purposes and the other only for picnics, bathing, etc. There is an excellent sand bathing-beach here, and as a summer hotel is situated on the immediately adjoining property there is always a large number of people who make use of this portion of the park.

Last spring the other part was surveyed into 58 camping lots with an average of 30 feet frontage. Permits are granted for camping privileges at a nominal fee of 50 cents per lot per month. Nineteen permits were issued during the summer, covering periods of from one to five months each. Probably each permit represents about four people, mostly women and children, so that, roughly, about 75 people camped here during the past summer.

NORMAN M. ROSS,
Chief of Tree-Planting Division.

APPENDIX NO. 2.

The following report concerns the work done in the Manitoba inspection district during the fiscal year 1916-17. It covers the work done on the Riding Mountain, Duck Mountain, Turtle Mountain, and Spruce Woods forest reserves, and on the Manitoba South, Manitoba North, Pas, and Port Nelson fire-ranging districts.

IMPROVEMENTS.

Riding Mountain forest reserve.—The road work on this reserve was confined to maintenance only, and principally to parts of the Central road and opening up of the Birdtail road. This work covering some 73 miles consisted of replacing and repairing bridges, grading, corduroying, etc., and was done by Forestry Branch teams and small gangs of men assisted by the rangers.

The present road system enables the officers to reach almost any part of this reserve with horses, but when funds can be obtained and conditions return to their normal state it is the intention to make further improvements, so as to permit automobile travel on some of the principal routes. This will give much more rapid access in case of fire, will enable the public to get in and out of the reserve, and will give travellers an idea of the work being carried on by the Forestry Branch. Frequent requests have been made to have this work carried out.

Work was performed on some 60 miles of fire lines and boundaries. New work covered 35 miles and consisted of clearing out the lines and piling the débris ready for burning. Ten miles of this were cleared under contract and the work was so satisfactory that it is hoped more can be done in this way. On the lines where clearing had been done in former years the débris was burned, some parts which were

open were ploughed, and in one section bridges were erected so as to enable teams to travel over it. Forestry Branch teams were used on all work possible for horses.

One steel look-out tower was erected in the Whirlpool district where a commanding hill permits an extensive view.

No new buildings were erected, though two ranger houses were improved and material laid on the ground for a new house in the Russell district which will be erected at an early date. The four cabins with their stables, which were built last year, were completed by being chinked and plastered so as to be habitable during the winter. These have proved great conveniences to officers when their work necessitated their being absent from headquarters over night.

The telephone work consisted of maintenance and covered some 200 miles, on 24 miles of which, in the Whirlpool section, poles were erected, as the original tree line was not found satisfactory. A quantity of new poles was taken out for repairs during the coming season.

Although it was reported that this line was not satisfactory no complaints have been laid by the officers on the reserve, and only on rare occasions has it been impossible for the supervisor to get in touch with the rangers, who report to him daily.

Duck Mountain reserve.—The principal road work on this reserve was done in the extension of the central road with the intention of completing it to the north boundary at Minitonas ranger station, but owing to the scarcity of labour and the high rate of wages and supplies this was not accomplished, though 28 miles were finished, leaving 6 miles to complete, which will be taken in hand as soon as possible.

New construction to the extent of 2 miles was found necessary on the Kamsack-Lake Madge road, as a homesteader, through whose property the original road led, desired to fence it in. We have now, however, a much better road over which visitors to the lake can travel with automobiles.

Work was commenced on a road from the north boundary to lake Madge to enable patrons from the Swan River valley to reach a very pretty beach at the northeast angle of the lake, where it is desired to establish a second summer resort. Some 4½ miles of this were put in first-class condition, and it is the intention to complete this at an early date.

Six miles of fireguard were cut and cleared in the Grandview district and the débris burned; in the Deepdale district 4 miles were improved and put in condition for travel, which will save the ranger some five miles when travelling north. Other fireguards were cleared up, and on one the line was widened five feet, and the débris burned wherever it was possible to do so.

Several minor trails were cleared out and repaired, and on the whole the work carried out has done much towards the opening up of this reserve and is most satisfactory, though it entailed very heavy work owing to the hilly nature of the country traversed.

The principal work on telephone lines was concentrated on the extension of the line following the central road, which comprised 28½ miles of No. 9 grounded line, which is practically all strung on poles, though, when suitable, trees were cut off and used. The maintenance of older lines demanded a good deal of attention, such as setting new poles and re-tying. It is desired to have telephone connection with the Kamsack ranger station, and in order to do this material was taken out to erect a line from lake Madge to the western boundary to connect with the Kamsack local system. The idea, however, had to be abandoned as it was found impossible to make satisfactory arrangements with the owners of the Kamsack system.

The Lake Madge summer resort as usual attracted a great number of people, on Sundays and holidays especially, the improvement on the road permitting the use of motors. Several very attractive cottages were erected and more attention generally was paid to this beautiful spot. A restaurant, with public stables in connection, was opened and proved a great convenience to transient visitors.

Material was taken out and work commenced on a wharf for use of the campers, and lumber laid down for two bathing-houses for the convenience of the lessees of lots who have, I understand, formed themselves into an association, with the intention of farming rules for the management of the resort and making marked improvements to their premises during the coming summer.

Turtle Mountain reserve.—The improvement work done was principally in the way of maintenance of trails and fire lines, only 6 miles of new construction having been undertaken and this was along the Canada-United States boundary, where 2 miles were cleared and ploughed while the timber was cut out along the other 4 miles, some of the heavy stumps having had to be blown out preparatory to ploughing. The remainder of work under this heading was in improving roads which also serve as fireguards, and consisted in grading, building bridges and culverts, and mowing and burning the growth at the sides. No new buildings were erected, but improvements were made at both headquarters establishment and the West cabin.

The pasture fence called for considerable repairs. Material was also placed on the ground for dividing the main pasture in two, the object being to keep the stock owned by patrons living to the west of the reserve separate from the stock of those living to the east.

The system of "cutting-out" corrals was installed at the east end of the pasture to facilitate the distribution of the stock in the fall, and has proved so convenient that it is intended to erect a similar set at the west end, for which purpose material has been secured from the Riding Mountain reserve, where some of the fire-killed timber was taken out during the winter.

Spruce Woods reserve.—No new work was undertaken on this reserve in the way of roads or fireguards, though maintenance work on the latter to the extent of 102 miles was carried on by re-ploughing 68 miles and disc-harrowing 34 miles. Nothing was done in the way of new buildings on this reserve, but necessary repairs were made.

The only new construction was that of a wind-driven pumping-plant set up at the south end of the pasture enclosure, consisting of a 10-foot wheel, 4 by 16 syphon-pump, 80-barrel storage tank, and a 24-barrel watering-trough. The water is obtained through four sand points, and an ample supply is always on hand. This plant was found necessary as stock had to travel too far to reach the ranger station.

All necessary repairs were made to the pasture fence by fastening wire, which in many places the moose had stripped off the posts for considerable distances, and setting new posts.

The work on telephone lines on this reserve was all maintenance, consisting of putting in some new poles, re-setting others that had been broken off at the ground but were still serviceable, and tightening wires.

SILVICULTURE.

Riding Mountain reserve.—There were 504 timber permits issued during the year, covering fuel, fence-posts, etc., to the amount of about 1,500,000 feet board measure. A large proportion of all timber taken out was from areas burned one or two years ago. The brush disposal was very satisfactory, the mill operators complying with instructions readily.

A quantity of fence-posts and rails was taken out for use on the Turtle Mountain and Spruce Woods reserves, where it is not possible to secure such material, and a supply of tamarack telephone poles was cut and distributed for repairs.

Duck Mountain reserve.—A long period of exceptionally cold weather prevented many people from going to the bush for timber, and of the 235 permits issued two-thirds were for free timber. The permits issued covered 500,000 feet board measure of lumber besides fuel and fence-posts.

The mill operators are realizing more each season that it is to their own advantage to leave the forest in good condition, the result being that the brush disposal on the Duck Mountain reserve was most satisfactory.

A quantity of telephone poles for repairs and new construction was taken out, together with material for a wharf at Lake Madge summer resort.

Turtle Mountain Reserve.—The number of permits was larger than in any former year, due, it is thought, to the financial stringency, as numerous settlers who had heretofore purchased fuel from outside points took advantage of the free supply offered under permit. One hundred and twenty-nine applications were made, calling for 3,311 cords of fuel, all of which was cut from dead or diseased timber.

No planting was done, but the experimental plantation was cultivated, trees were hoed and cleared of weeds, and protection given by the erection of a rabbit-proof fence, as during the previous year these rodents had done considerable damage to the transplants.

Spruce Woods reserve.—Fifty-seven timber permits calling for 366 cords of fuel were taken out. These permits covered only dry or diseased timber, as the practice of confining cutting to these classes is still adhered to. No trouble was experienced on this reserve over the brush disposal question.

While no tree seeds were sown on either of the nurseries, these were kept in good condition and the usual work of weeding and watering carried on. Sunflowers were planted round the tree beds to protect them from drifting sand.

To the south and west of Shilo headquarters, 28 acres were planted from the nursery beds. This plantation comprised jack pine seedlings, 17 acres; mixed jack pine and caragana seedlings in alternate rows, 1½ acres; jack pine transplants, 5½ acres; lodgepole pine transplants, 4 acres. The results of this planting have been very good and the losses have been light.

Vigorous growth has taken place in the Scotch pine plantation to the south of Camp Hughes, where the only work required in the past season was that of clearing the fireguards. Little damage was done last winter by rabbits, though heavy drifts of snow broke down and injured some of the trees.

The success met with in this project is very gratifying and demonstrates that when funds are available the reforestation of this reserve can be undertaken with fair prospects of success, provided the fire danger can be controlled. Already our work in this line is showing good results.

GRAZING.

Riding Mountain reserve.—There is no closed grazing on this reserve, but twenty permits were issued for open grazing covering 499 head of stock. As there are very large areas of excellent, well-watered pasture lands to be found, it is hoped greater use will be made of these advantages in the near future.

Duck Mountain reserve.—Little attention was paid to the large areas of pasture land on this reserve, and only two permits covering 68 head were taken out. This is no doubt due to the fact that there are large areas of unoccupied land adjacent to the reserve which furnish grazing for such stock as are owned by the settlers in the vicinity.

Turtle Mountain reserve.—On this reserve seventy-two permits were taken out for 1,231 head of stock, of which 118 were horses and about 75 head, under six months of age, the progeny of the herd. This shows a steady increase from former years and is practically double the number grazed last year. Stock were brought from a distance of 50 miles, and as many as 40 head were the property of one owner.

The pasturage was excellent, and stock when handed over to the owners at the end of the season were in the pink of condition.

There is ample accommodation for many more head, and the herd is expected to be increased this coming season. Arrangements are being made to keep stock coming from the west separate from that from the east, thus making it more convenient for patrons to remove them in the fall. There was no open grazing this year on this reserve.

Spruce Woods reserve.—The number of stock grazed did not come up to expectations, high prices for all classes of stock and the great demand induced many owners to dispose of or reduce their herds. Permits covering 292 head of cattle and 77 horses were issued for the enclosed grazing and for 60 head of cattle on the open grazing. The trouble formerly experienced from footsoreness, caused by the long walk to water, was overcome this season by the installation of the wind-mill pumping-plant at the south end of the enclosure. This was found most satisfactory and the stock in the enclosure were delivered in good condition.

USES OF LAND.

Fish and Game.—On lake Max and other bodies of water in the Turtle Mountain reserve, where in the past the good fishing was such an attraction, great numbers of fish were found dead on the opening of spring. While the cause is not known it is thought this may have been due to the heavy snowfall which occurred early in the fall, immediately after the lakes froze, and which excluded the air from the water. The result was that no fish were caught in these waters and many of the former patrons did not visit the lake. During last winter, however, fish were seen at the water-holes. This, together with the fact that the same trouble occurred in lakes in the vicinity of the Duck Mountains, confirms my opinion that it was lack of air which caused the fish to die, and not the decay of vegetable matter; and I hope the stock may be replenished,

On lake Madge, in the Duck mountain, good fishing was to be had and some of the pickerel, with which the lake was stocked two years ago, were taken but returned to the water.

A large number of sportsmen hunted in the Riding and Duck mountains during the big game season and most parties met with success.

The game laws were changed at the last session of the Manitoba Legislature and the killing of elk and all varieties of grouse was prohibited. This was very necessary, as the former are getting scarce while practically no prairie chicken or partridge were to be seen during the shooting season last fall. Numbers of partridge and chicken are, however, to be seen now, and it is hoped that if this is a favourable breeding season and the law is enforced, the supply will increase.

Hay permits.—Three thousand six hundred and forty-two tons were covered by 196 permits which were distributed over the different reserves as follows:—Riding Mountain, 101 permits, 1399 tons; Duck Mountain, 50 permits, 1505 tons; Turtle Mountain, 37 permits, 578 tons; Spruce Woods, 8 permits, 160 tons.

As a safeguard against fire, and to improve the yield, rangers have been instructed to burn off all meadows wherever possible before the snow melts in the bush.

Summer resorts.—Owing to the financial stringency and the absence of so many of our young men who have enlisted, the summer resort patrons did not improve their lots as it was expected, though week-end visitors were quite numerous, particularly at lakes Max and Madge which are the most popular summer resorts.

Clear Lake summer resort.—Little attention was paid by the public to this resort in the Riding mountains and at the original site no new lots were taken up, but

another beach was laid out at the east end and several of these lots were taken up. The holders intend to build this summer.

Lake Max summer resort.—Though there were not the usual number of campers attending lake Max, Sundays and holidays found very large parties, and all the cottages were occupied during the season. The failure in fishing had a great deal to do with this falling off of visitors.

Lake Madge summer resort.—The road leading from Kamsack to the summer resort at lake Madge was improved so as to enable motors to travel over it, with the result that there were more transient visitors than during any previous year. While but few additional lots were taken up a number of very attractive cottages were erected and more attention was paid to keeping the premises neat. The lot-holders are taking keen interest in this resort, and have formed themselves into an association with a view to establishing rules for its management. A number of new boats, several being motor driven, were placed on the lake and a boat livery was in operation for use of transient visitors. A wharf for the use of the public is in course of construction, which will encourage the use of better and larger craft on the lake, an ideal spot for boating.

There is another very pretty beach at the northeast angle of the lake where the residents of the Swan River valley desire to establish a summer resort, it being more accessible for them than the present site. It is the intention to lay out a number of lots along this beach during the coming summer, and, as the road to it is practically completed, I expect it will become a popular camping ground.

SURVEYS.

No alterations were made in the boundaries of the forest reserves in Manitoba during the year, but reconnaissance surveys were carried on outside of the reserves by two parties, the object being to ascertain whether the areas covered were suitable for agriculture or should be formed into forest reserves.

Messrs. L. S. Webb and G. M. Linton covered that tract situated on the east shore of lake Winnipeg northward from Poplar river to the north boundary of township 57, and from the lake front to the Ontario boundary, some 12,456 square miles, through which area several large streams flow. Practically no agricultural lands were found, and recommendations have been made that it should be formed into a forest reserve so as to provide better protection from fire. This would also provide for the proper administration of the timber, much of which, it is thought, will ere long be of such value as to warrant marketing.

The territory examined by Messrs. E. J. Guay and Thomas Maher covered some 3,500 square miles, between townships 37 and 51 and the Canadian Northern railway and lake Winnipegosis. No agricultural lands of any value were found in this area, but there was not a sufficient quantity of timber to warrant the establishment of a forest reserve, nor does it contain the source of any streams whose watersheds would call for conservation. A few isolated areas were found suitable for settlement, most of which were occupied.

FIRE-RANGING.

The fire-ranging work outside of the forest reserves was divided into four districts, viz.: Manitoba South, Manitoba North, Pas, and Port Nelson.

Manitoba South district.—This district was divided into thirteen patrols, there being thirteen rangers and four assistants. The staff, on the whole, was a great improvement over the previous year and gave very good service.

The patrols were made both by canoe and on foot, the lake Winnipeg and lake Winnipegosis patrols being made by canoe and sail-boat. We also had a small skiff with a detachable gasolene engine which proved very advantageous to the service.

On account of the heavy snowfall in the winter of 1915-16 and frequent rains in the spring and early summer the country was very wet and most favourable for our work.

In all we had five large fires reported, covering an area of 1,040 acres and incurring an expenditure of $7.20, exclusive of ranger service, which is indeed most satisfactory. There was no merchantable timber destroyed and very little young growth. There were also 34 small fires, covering not more than ten acres each, which were extinguished by the rangers and caused no extra expense.

The season can be termed as very fair, and the good service rendered by the majority of the rangers is in no small measure accountable for the result.

Manitoba North district.—The Manitoba North fire-ranging district has been for some time under the charge of Mr. J. T. Blackford at Norway House, the patrol work being performed by Indian rangers who have an intimate knowledge of the districts to which they are assigned. These men work in pairs, and patrols are made by canoe.

Mr. Blackford has been furnished with two motor-canoes, for his use in the waters accessible to his district without portaging, which are found most serviceable. He frequently makes inspections of the outlying districts to see that the rangers are doing their work properly, and at the same time interviews as many of the Indian tribes as possible. When it is not possible during the summer to complete the reports or prepare maps of each of the fires that may have occurred Mr. Blackford travels by dog train in winter and secures this information.

It is very pleasing to note that only six large fires and six small ones are reported for the season of 1916, and though they burned over a considerable area very little damage was done.

The season, on the whole, in this district was very satisfactory and is no doubt due to the strong influence Mr. Blackford has with the people in his district and the co-operation he receives from the Indian chiefs.

Pas district.—This district was again handled by Chief Ranger Fischer and nine rangers, eight of whom were allowed assistants as all the patrols are made by canoe. It might be well to mention that Mr. Fischer enlisted for overseas service in August and his place was filled by Mr. B. M. Stitt who handled the district very well during his term of office. Very good results were obtained in this district, there being only three fires reported which burned over an area of 680 acres and incurred an expenditure of $79, exclusive of ranger service. Very little damage was done to the timber, the estimate of damage done being $2,000. This is a very satisfactory report when one takes into consideration the fact that miners and prospectors were so active in different parts of the district.

Port Nelson district.—This district was organized during the early part of the season, there being two rangers, each with an assistant. Patrols were made in canoes, one ranger taking the Nelson river and the other taking the Hayes river. The patrol work was kept up until the latter part of October and no fires were reported during the season, which is indeed very satisfactory.

Fires in forest reserves.—The past season has probably been the most satisfactory we have had in this district. No fires were reported from the Turtle Mountain or Spruce Woods reserves, and only one on each of the Riding and Duck Mountain reserves. This is most satisfactory, and is no doubt due to a large extent to the publicity work done and educational policy carried on by several of our officers in the course of the last year. It is very gratifying to note the hearty co-operation we

are receiving from the settlers living adjacent to the reserves in respect to forest fires. The weather conditions for the greater part of the season were very favourable to our work and, coupled with the heavy snowfall the previous winter, helped materially to keep the fire danger down.

F. K. HERCHMER,
District Inspector of Forest Reserves for Manitoba.

APPENDIX No. 3.

This report concerns the Saskatchewan inspection district for the fiscal year 1916-17.

The province of Saskatchewan has a total area of 251,700 square miles or 161,088,000 acres, with an average population of about two people to the square mile, or one person to every 320 acres. Approximately 151,000 square miles or 96,640,000 acres lie south of the Churchill river, with an average population of three and one-third people to the square mile, or one person to 200 acres. At the present time the work of the Forestry Branch pertains only to that part of the province lying south of the Churchill. The work of the branch is divided into two classes in this district: (1) the forest reserves, and (2) the fire-ranging outside forest reserves.

FOREST RESERVES.

There are fifteen forest reserves with an area of 10,279 square miles or 6,578,560 acres. They can be divided into prairie reserves and timber reserves. The prairie reserves are: Dundurn, Elbow, Keppel, Manito, Moose Mountain, Beaver Hills, and Seward, with an area of 469,696 acres. These reserves occupy areas totally unfit for agricultural purposes, either on account of the sandy condition of the soil or on account of the unevenness of the topography, and at the present time a large portion of the area is open grazing land with only scattered areas of timber, composed mostly of aspen or white poplar.

The timbered reserves are located mostly in the northern part of the district and comprise the following reserves: Big River, Fort à la Corne, Nishet, Pasquia, Porcupine, Pines, Steep Creek, and Sturgeon, with an area of 6,108,864 acres. The area within the boundary of these reserves is suitable only for the growing of timber and for grazing purposes either on account of the soil or topography.

Each forest reserve is divided into ranger districts, according to the size of the same. These districts have an average area of 187,973 acres. On each district are constructed comfortable headquarters for the ranger, and he is required to live on his district during the entire year. Each reserve is placed in charge of a supervisor or ranger-in-charge, and this man is held responsible by the Forestry Branch for the proper handling of all classes of work on the reserve under his jurisdiction.

FIRE-RANGING.

The fire-ranging area practically comprises all the timbered country south of the Churchill river and north of the Saskatchewan river, outside of the forest reserves. It is divided into the Battleford and Prince Albert fire-ranging districts. These districts have a total area of 47,736 square miles, or 30,551,040 acres. This area is divided into ranger districts varying in size from 391,680 acres to 2,534,400 acres, with an average of 1,041,108 acres. The smaller districts are located along the

northern line of settlement, where the danger from fire is at a maximum. In the larger and more northern districts only the used waterways are patrolled. The districts, however, are very much too large to give the best results, but the men are doing good work and there has been very little loss from fire during the past two years in these outlying districts. The primary work of the men on the fire-ranging staff is fire patrol, but during the periods when there is very little fire danger they are employed on improvement work, such as keeping all old trails and portages open, cutting new trails and portages when needed, constructing lookout towers, small cabins for stopping places, tool caches, and storehouses. There is always plenty of work to keep the men busy at all times.

The Battleford district lies west of the line, passing approximately north and south through the town of Big River, and comprises an area of 16,812 square miles, or 10,759,680 acres. This area is divided into eleven districts, with a chief fire ranger and one sub-chief fire ranger. The average area for each ranger district is 978,153 acres.

The Prince Albert fire-ranging district comprises all the country east of the Battleford district, and is divided into seventeen ranger districts with one chief fire ranger and two sub-chief fire rangers. It comprises an area of approximately 30,924 square miles, or 19,791,360 acres. Each ranger district has an average of 1,164,197 acres.

IMPROVEMENTS.

During the past year the making of improvements was carried out steadily on the reserves. They included 4 houses, 7 cabins, 19 stables, 7 other buildings, 101 miles of roads and trails, 20 lookout stations, 42 miles of telephone line, and 46 miles of fireguard. Considerable fencing and other improvements were also carried out. On the smaller reserves, in the prairie districts, the necessary improvements are now fairly well on towards completion. Good progress has been made on the large reserves in the northern part of the province. On the Porcupine and Sturgeon forest reserves the roads and telephone lines constructed have greatly improved communications on these extensive and previously largely inaccessible tracts. The programme of improvements on the other of the larger reserves in the north, the Big River reserve, is not so far advanced.

On the Nisbet forest reserve a special improvement cutting was made for a distance of four miles along the road through the eastern block of this reserve. Travel to and from the city of Prince Albert along this road is frequent. All the brush, infected timber, and dead and down material was cut along this road, thus removing a serious fire danger and greatly improving the conditions in that locality. Improvements and extensions of fireguards, not included in the figures given above, were made on other reserves, particularly the Beaver Hills, Pines and Moose Mountain reserves.

FIRES.

No serious fires occurred during the year in the district, and only two-tenths of 1 per cent of the forest reserve area was burned over, this being mostly grass land, including only 10 acres of merchantable timber damaged.

The total expenditure, including ranger's time expended on extinguishing fires, amounted to $180, or less than 1 per cent of the previous year's cost. The danger period only lasted a fortnight in the spring, while during the remainder of the year moisture conditions and precipitation were such that very little danger of fire existed. What few fires occurred were mostly small. The causes to which fires were attributed were divided into the following classes: settlers, 51 per cent; campers, 19 per cent; unknown, 17 per cent; railways, 10 per cent; lightning, 3 per cent.

Inside forest reserves there occurred 8 large and 15 small fires, a total of 23, which burned over 11,195 acres. Damage to the extent of $725 was done, and the expenditure to extinguish amounted to $45.

The size of the average fire exceeding ten acres amounted to 1,381 acres burned over, in contrast to 2,000 acres the previous year.

Outside forest reserves and in fire-ranging districts, 8 large and 24 small fires occurred, a total of 32, which burned over 24,605 acres, costing $135 to extinguish, and doing an estimated damage of $5,820. Less than three one-hundredths of 1 per cent of the area patrolled was burned over.

The erection of lookout towers, opening of trails, building of telephone lines, and the appointment of assistants to the rangers with canoe patrols, greatly increased the efficiency of the force. The addition of three sub-chiefs, to continually cover several districts and direct the work of the men, secured better results in the work and more prompt action in the submission of reports and the handling of accounts in the fire-ranging territory. The forest reserve rangers had additional assistance for a few days in the spring in order to burn off fireguards, and hay and grass lands, thus insuring a large amount of protection at a very low cost. This was an exceptional season compared with last year, when the total loss of merchantable timber amounted to $742,000, and when also there were large and valuable areas of young growth destroyed.

The average loss each year of all classes of timber, i.e., merchantable saw-timber, cordwood, pulpwood, and reproduction—would be close to one million dollars. This loss is the same as a total destruction of interest-bearing assets, and the interest is lost as well as the principal. It will take one hundred years of hard labour on the part of the Forestry Branch to replace the principal, the loss of which was due, to a great extent, to lack of interest. A great part of the loss of merchantable timber was due to the fact that the operators on timber berths are allowed to leave a fire-trap on all cut-over areas.

So long as the present system of cutting is allowed on timber berths it will be practically useless to attempt the restocking of burned-over areas, and the loss from fire will always be great until some change is made for the better.

EQUIPMENT.

Within the year a fairly good supply of fire-fighting tools, portable telephones, telephone construction equipment, wagons, canoes and all other necessary equipment, has been supplied to the reserves and fire-ranging districts. These tools and supplies are placed at reserve headquarters, ranger stations, stop-over cabins, and tool caches. Each ranger is required to have the equipment in his district always ready for immediate use. An adequate supply of equipment is very necessary in all districts, as articles of this nature cannot be secured locally in quantities sufficient to meet emergencies.

A supply of provisions is also placed in the more remote districts for fire-fighting purposes. In fact, every effort is made to keep the men in the field well supplied with all necessary tools, etc., so that there can be no excuse for not getting results because of lack of equipment.

GRAZING.

The development of the grazing industry on forest reserves has taken place within the past three years. This has been brought about by a system of regulations which allow stock owners to place stock on the reserves under a permit system at very reasonable rates. The applicant is required to take out a permit each year for the number of head he wishes to run, but, in order to make the industry as permanent

as possible, the permittee is assured that the permit will be renewed each year in accordance with the regulations in force on the reserves. Permits are issued, at a nominal charge, to users of the range for the construction of corrals, herders' cabins, stables, water-tanks, and all other improvements that are required to properly develop the range.

The conditions in the vicinity of the prairie reserves are such that the Forestry Branch is practically forced to issue fencing permits in order that the range can be used by the stock owners. It is always desired that as large areas as possible be fenced, as good-sized fenced areas are better for the stock, there are fewer gates to be opened by the travelling public, and the cost of fencing per head is much less than for small pastures. In order to secure these advantages the small owners are forming stock associations, fencing large areas, and running their stock in common, under rules made by the association and approved by the department. This method seems to work to the advantage of all concerned. Five stock associations are organized and using fenced areas at the present time.

The number of stock under permit on reserves in 1915 was 4,500. In 1916 there were approximately 100 permits issued for 6,500 head of stock, an average of 65 head per applicant. Approximately 10 per cent of the number were horses. Placing the average value per head at $75, the stock on the reserves had a total value of $487,500. Six thousand head of this stock were run on the prairie reserves with an area of 469,696 acres, and only 500 on the northern reserves with an area of 6,108,864 acres.

The range conditions on the prairie reserves are ideal, as there are large areas of open grass land well supplied with good water. The range on these reserves is stocked to 50 per cent of its capacity. The prairie reserves will carry about 12,000 head.

There are large areas of good range country on the northern reserves, equal to any on the prairie reserves. These areas are open, hilly country, with good feed and water. There is also excellent feed on the burned areas, and in many places there is an excellent growth of pea-vine, etc., in the green timber, which makes excellent feed in late fall and early winter. Cattle on the Porcupine reserve were doing well on this class of feed as late as the middle of November. Fully 30 per cent of the wooded reserves could be used to advantage for grazing purposes, and, if used, would carry 60,000 head of stock where only 500 were grazed last season. This valuable asset is being neglected at the present time, but I believe that within ten years these areas will be fully stocked. When the need arises larger areas of the reserves will be used for grazing purposes, as the above only applies to the more accessible areas. The proposed reserves will carry as many stock as the present reserves.

Permits were issued in 1916 for 5,000 tons of hay on the prairie reserves, and for 1,700 tons on the northern reserves. The cut on the prairie reserves could probably be increased by 25 per cent, but on the northern reserves 30,000 tons of hay could be cut with very little improvement work on the meadows. Large areas of hay land could be made available by drainage, clearing out the willows, etc.

SILVICULTURE.

Sales and Permits.—The timber sale work has been increasing yearly and during the past fiscal year two old sales have been running, four new ones were awarded, and four applications reported on but not advertised, due to the small amounts applied for very late in the season or to the immature material desired. The total amount cut on these sales in the district will run about one million feet board measure. About 90 per cent of the timber is white spruce, the remainder is divided among tamarack, jack pine, balsam fir, poplar, and birch. Two sales were in operation on the Porcupine reserve, two on the Pasquia, one on the Fort à la Corne, and one on

the Big River reserve. Ten small mills have been operating on the reserves in this district, six of which have been running in connection with timber sales, while the remainder were sawing mostly on settlers' permits. The demand for lumber has been very brisk during the latter part of the season and the prices obtained by the manufacturers have again reached a par with the high prices prevailing during 1912. Several of our sales have covered burned timber or territory culled over by previous operators or settlers, and a considerable improvement in the condition of the forest has been obtained by the present operations. Burned and wind-felled timber has been taken out and saved from decay; old logs and tops, which had been left from previous cuttings, have been removed and sawn. Considerable over-mature material has been cut and, with the cleaning up of the areas by the strict enforcement of the brush-burning conditions, the safety of the remaining timber is increased, and the silvicultural conditions greatly improved. Close supervision by the forest officers in marking, scaling, and the enforcement of brush burning has greatly improved the appearance of the cutting areas, and the present staff are securing fair results in this silvicultural work, when there is taken into consideration the short time the regulations have been in force and that the staff had no previous experience. As the timber sale work continues to increase, the men on the ground will require better qualifications in order to properly handle the work, and the efficiency of the present staff would be greatly increased by a system of ranger meetings in which the men would be instructed in the fundamental principles of mapping, estimating, marking, and scaling.

The wood-cutting operations were quite extensive on all of the reserves last season, and the price on cars averaged from $3.50 per cord for poplar to as high as $5 per cord for tamarack. The average for all species was about $4 per cord, f.o.b., throughout the district. The retail price ran from $6.50 to $10 per cord. On all the operations within the reserves all brush was burned.

In granting all timber sales, timber permits, and wood permits, it is the aim of the branch to dispose of all the dead, down, diseased, and over-mature timber that can be used under the requirements of any of the above permits. In all cases the permittee is required to burn all brush and refuse from his operations. The brush and refuse from a logging operation is always ready for a match and when once started nothing can stop it until the entire area is burned. The best method of protecting this valuable national asset is to require all operators to dispose of the brush as the logging operation proceeds, so that fires which do start may be controlled.

PLANTING.

Four-acre experimental plantations of white spruce, Scotch pine, jack pine, and caragana were set out on the Dundurn, Manito and Elbow forest reserves in the spring of 1916. The seedlings used were mostly 2- to 3-year-old stock which was planted in both pure and mixed arrangement. The areas were located in close proximity to ranger headquarters in order to ensure the maximum protection. Sites were selected that were typical of the whole reserve as nearly as possible, and thus a variation in exposure and soil was secured, depending upon the topography of the areas, which was mostly rolling. The areas planted were open and of sandy soil, and the planting was done in furrows with the planting iron. The stock was shipped from the Indian Head nursery, and supervision of the planting was given by a special man detailed from the nursery station assisted by the forest rangers. The rate of planting averaged about one thousand trees per man per day, and the cost per acre about $15. This should be greatly reduced if the work were conducted on a larger scale. The areas were fenced and surrounded by fireguards. The season was very favourable, with an abundance of moisture, and the growth, so far, has been fairly good. Reports show that less than 1 per cent of the jack pine seedlings have failed,

while the Scotch pine and white spruce show approximately 33 per cent failure, due to winter-killing and being covered up by moles.

Some fifteen hundred seedlings were planted out in the old "burn" on the Pines forest reserve. This stock consisted of white, Norway, blue and Engelmann spruce; and of Scotch, jack, rigid, yellow, and lodgepole pine, all grown in the local nursery at the headquarters of the reserve. The planting was done in furrows with the planting iron, and the trees have made a very good showing for the first season. Forty-seven new beds in the nursery were seeded down to jack pine in the spring, the seed of this species being the only kind obtainable for this purpose. The seedlings all made a good growth, with the exception of four beds which were killed by the cutworm and had to be re-sown in July.

The small plantations around the ranger stations on the Nisbet, Moose Mountain, and Beaver Hills forest reserves were increased by the addition of four hundred trees at each place, and these are all doing well. The trees planted during previous years are beginning to make a very noticeable growth, and not only greatly improve the appearance of the grounds but attract the attention of the public.

Planting on a large scale will not be practicable until the fire danger is reduced to a minimum. This can be accomplished on the prairie reserves where there are no timber license operations, but, as to the reserves which contain timber berths, until it is the rule that brush from operations on timber berths is burned or otherwise disposed of, it would be a waste of money to attempt restocking these reserves as, under present conditions, it is impossible to protect what nature has placed there at no expense. More young material is burned in an average year on cut-over lands within reserves containing timber berths than could be replaced by planting in fifty years.

SURVEYS.

A reconnaissance survey was completed by Mr. G. A. Mulloy on an area of 2,500,000 acres lying north of the Torch river and east of the Candle lake. This area is classified as follows: lakes, 2·05 per cent; muskeg, 53·8 per cent; merchantable timber, 4·8 per cent; old "burn", with reproduction, 6·09 per cent; old "burn", not reproducing, 0·38 per cent; woodland or cordwood, 27·87 per cent; "burn" with scattered trees, 5·01 per cent.

Mr. Mulloy states that in the whole area examined hardly an acre of agricultural land was discovered and that the well-wooded portion of the area will, if protected, prove to be of immense value to the adjoining prairie in supplying firewood, ties, posts, poles, and a large amount of saw-timber. The greater part of the area is young, thrifty reproduction about twenty-five years old, and this, if protected for a few years, will produce an enormous quantity of valuable material.

SUMMARY.

All branches of the work in the district are progressing very favourably and along permanent lines. Practically all of the development in the district has taken place since 1912. The reserve areas were in very poor shape when turned over to the Forestry Branch as they had been devastated by fire, cut over without supervision, and all slash left on the ground. This slash is the worst fire danger to the forest and is the primary cause of more fire loss than any other one agent. The slash is being burned on reserve operations without trouble.

The staff on the reserves has developed rapidly in the past three years, and the officers are interested in their work and are showing good results. The progress of improvement work has been rapid and at the present time all supervisors and rangers

have good, comfortable living quarters located on the reserves. Lines of communication are well opened up, and the fire protection system improved by the building of many lookout towers, provision of equipment, and construction of telephone lines.

From a silvicultural standpoint the reserves are being cleaned up as fast as possible, by removing the dead material and burning all slash on operations under the Forestry Branch supervision. The first aim is to protect the forest areas from fire and this can be done only by removing the chief source of danger—slash.

G. A. GUTCHES,
District Inspector of Forest Reserves
for Saskatchewan.

APPENDIX NO. 4.

This report concerns the Alberta inspection district for the fiscal year 1916-17. In presenting the annual report of the work of the district for the past fiscal year it is perhaps unnecessary to point out that this organization, as well as others, has been working under very serious handicaps, brought about by a state of war. Organizations which have been brought to a high state of efficiency are generally able to contend, more or less adequately, with conditions that may come about; others, not so highly developed and organized, must naturally suffer to a greater degree, and at times must face conditions which are discouraging and sometimes appear almost hopeless. Forestry, which in this country is still in a very elementary state of development, must naturally suffer a retarding effect under present conditions. Not only is it difficult to provide for new lines of work which are of extreme importance, but it is necessary to considerably curtail work which is fundamentally essential to normal development. There is, however, one aspect of the work which, in spite of present handicaps, should add incentive and bring into play all the energy and initiative at command—the national importance of the work both for the present and future welfare of the country. Forestry has given its quota of men who have fought and died in the great conflict taking place. Some of these went from the lower ranks, while others were young men who had devoted a number of years to a study of the profession. If for no other reason we owe it to these heroes to "carry on."

BOUNDARIES.

No material change took place in the boundaries or areas of the forest reserves in Alberta during the past fiscal year. In the Peace River country, however, numerous temporary reservations were made, on the basis of reconnaissance surveys previously conducted by officers of the Forestry Branch. These reserves have been made not with a view of decreasing the amount of land available for legitimate settlement but for the purpose of preventing, so far as possible, the occupation of non-agricultural lands by settlers who have little knowledge of land or by those having in view some ulterior motives, rather than legitimate agricultural pursuits. The withdrawal of these lands from indiscriminate settlement is a measure calculated to protect not only the interests of the country at large but also the individual interests of the incoming settler. In every country there are lands which are essentially agricultural and which, consequently, should be devoted to that purpose; there are also lands which are absolutely unsuited to agriculture but which are very suitable for forest pro-

duction, and it is self-evident that in such cases the land should be so utilized. Between these two extremes there are lands which might serve, to a very limited extent, the purpose of agriculture, but which, in the final reckoning, can never be so productive for agricultural pursuits as to warrant their being set aside for that purpose. In the case of temporary reserves of the Peace River district an effort has been made to exclude, so far as possible, all areas having even a semblance of being real agricultural land. In other words, so far as possible, the policy of including in such reservations only absolute forest land has been followed. There are some who are of the opinion that greater areas might consistently have been included within the temporary reservations, but it is considered that the steps which have been taken by this branch, in so far as these reservations are concerned, are adequate for the present time, and that, if sufficient development takes place on these areas, with a view to proper protection and management of them, a very good beginning will have been made in establishing a forest policy in that district. In some parts of the western provinces there are notable examples where settlement was allowed on absolute forest land, which action simply resulted in the denudation of the land by the bogus settler and its ultimate abandonment by him. By having these land examinations made as far in advance as possible, measures can be taken to protect the country and the people against this detrimental class of settlement. As soon as it is possible to do so these temporary reserves should be set aside and administered as forest reserves in full standing. It is self-evident that if such reserves are to be placed on the same basis and run along similar lines of organization as the older established reserves it will be necessary that adequate provision of funds should be made. Under present appropriations it is not possible to give more than an exceedingly limited measure of fire protection to these areas. Not only is considerable expenditure necessary in connection with the development of proper forest management, but also, if only for the development of a systematic scheme of fire protection, it is necessary that considerable funds should be available for the development of transportation and other facilities in the reserves.

The readjustment of boundaries between Dominion parks and forest reserves has not as yet been finally settled. It appears, however, that this problem is at last nearing a state of solution, and it is sincerely hoped that the next fire and improvement season may be entered upon with definite and final ideas as to the respective boundaries between Dominion parks and forest reserves. In some cases it is evident that co-operative measures must be adopted for the protection of adjoining parks and reserves, but, as has been pointed out in reports submitted during the year, there are no legitimate reasons why such co-operation could not be established.

The work of boundary surveys was continued, and during the past year a complete survey of the outer lines of the Cooking Lake forest reserve was made. In conjunction with this a considerable amount of interior survey work was done for the purpose of re-establishing lines which had become obliterated. Boundary work was also carried out on the Porcupine Hills section of the Crowsnest forest. It was expected that this latter survey would be completed, but, owing to the serious situation which developed in labour conditions, it was found necessary to discontinue the work before completion.

FIRE PROTECTION.

The conditions which obtained during the fire season of 1915 were practically repeated during 1916, and at no time during the season did the conditions on any reserve in the district become really serious. Throughout the Rocky mountains and also, with the exception of a few short dry spells, on the other reserves there was abundant precipitation distributed fairly well during the season. While the occurrence of these wet seasons certainly reduces the actual loss in forest resources for these

particular seasons, it is, unfortunately, not a condition which is in itself conducive tc the building up of an efficient fire-fighting organization. It follows that urgent efforts must be directed toward educating both forest officers and the general public along such lines as will secure, so far as possible, the prevention of fires. Also, every effort must be made to develop to the utmost the facilities for actual fighting of fires which must inevitably occur. From the experience of the past few years it may be stated that fires are, in the majority, confined to those caused by human agencies. Lightning fires do occur, but the situation of this inspectorate in this respect is much better than that of some other forest protective organizations. In any case, when the organization here is so developed that it can successfully combat, under any conditions, fires directly attributable to human agencies, it will, incidentally, be in a position to keep good control of fires which may have their origin in lightning.

The total number of fires reported as actually occurring on the reserves of the district is ten. This figure in itself is indicative of the character of the season. The area burned over was confined to approximately 7,000 acres, which is almost a negligible figure as compared to the total area of the forest reserves of the district. The total damage resulting from these fires is estimated at approximately $1,800, including damage to both merchantable timber and young growth. While the total number of fires occurring was so small that statistics are not of much value for comparsion it may be pointed out that more fires occurred during the month of May than at any other time. June and July, according to the statistics, were the next worst months, although as an actual matter of fact there was very extensive precipitation during these two months and, consequently, they were not really as dangerous as the statistics would imply. Of these ten fires, four are attributed to railways; for three, the causes are unknown; and one each is attributed to lightning, hunters, and saw-mills. If a bad season had been encountered in 1916 there probably would have been considerable difficulty in adequately coping with it, owing to the exceedingly serious condition of the labour market. While it is true that for some fires help can be drawn from the farm and ranching lands in the vicinity of the reserves, as a general rule, when it comes to serious fires, it is necessary to draw for help from the labour markets of the towns and cities. Last year the help of this character which could have been secured was exceedingly limited. Probably during the coming season the branch will be still more seriously confronted by this situation and, as previously indicated, it is felt that some arrangements should be made whereby it might be possible to draw to a certain extent on the military forces which may be mobilized and available. It seems that an arrangement of this kind would be quite in keeping with the fundamental idea of National Service, for it is of the utmost importance to this country that the natural resources should be protected. In view of the fact that there may also be a shortage of labour on the farms it would seem desirable to avoid, so far as possible, the ordering out of labour so employed; consequently, it would appear that the only material source of labour supply may be the military forces. Although there is no reason, on the basis of present conditions, to anticipate a particularly dangerous season it appears that the amount of snow which fell in the mountain sections during the past winter was considerably less than in the previous winter. If there is a fairly dry spring and not the usual rainfall in June and July conditions may become very serious indeed.

IMPROVEMENTS.

I have pointed out that the unusually wet season rendered conditions very favourable for fire protection; in the case of improvements the reverse is true, and work in this direction was attended by considerable difficulties; moreover, the serious labour shortage was keenly felt on every reserve of the district. For these reasons it was entirely out of the question to complete the programme of improvement work which

had been laid out and for which funds had been provided. When the labour shortage occurred it might have been possible to complete the plans laid out by paying extremely high wages, but it was considered inexpedient to increase wages unduly, owing to the fact that there was evidence of a very serious shortage of labour in the agricultural sections of the country. Notwithstanding weather and labour conditions very material progress was made, and another fire season will be approached with better improvement facilities than heretofore.

Athabasca forest.—A total of approximately 57 miles of trail was constructed, 15 miles primary and the remainder secondary. Toward the end of the fiscal year steps were taken for the provision of telephone poles for the first link of the Lower telephone line, which will probably be constructed during the coming season. Two or three cabins and tool caches were constructed, and one 40-foot lookout tower was framed from timber. A considerable amount of time was expended by the staff of the reserve in the preliminary location of trails, as a basis for improvement work of the next few years.

Brazeau forest.—On this forest approximately 13 miles of primary trail were constructed and 27 miles of secondary. Other trail work which had been planned had to be abandoned. A considerable amount of maintenance and preliminary location work was also performed by the staff. In telephone work two short branch lines, totalling 17 miles in length, were completed.

Clearwater forest.—In this forest there were built 19 miles of primary trail and 127 miles of secondary. This, added to the trail equipment provided in previous years, renders a very considerable part of the reserve accessible within reasonable length of time. In addition to this entirely new construction a very considerable amount of maintenance work was done on previously constructed trails which had suffered damage as a result of floods. Two cabins were constructed in outlying parts of the reserve, while at Nordegg a good beginning was made in connection with the various buildings and fences of the headquarters at that point. Toward the end of the fiscal year steps were taken to provide telephone poles, in anticipation of a certain amount of telephone construction during the coming improvement season.

Bow River forest.—A total of approximately 85 miles of primary trail and wagon road was constructed. The construction of these trails renders accessible certain parts of the reserve through which travel was formerly tedious and slow. The most important improvement project constructed on the reserve was the North Trunk telephone line, connecting Morley, on the main line of the Canadian Pacific railway, with the Red Deer ranger station, a total construction distance of 45·3 miles. About half of this line is of standard pole construction, while the remainder is of the tree line type. The line is of first-class construction, and places the district inspector's office in quick communication with two important administrative headquarters on the north half of the Bow River forest. Another exceedingly important project, which was started during the winter months, is the Elbow bridge. In previous reports I have drawn attention to the necessity of reducing, so far as possible, the hazard which occurs in fording some of the larger rivers in the Rocky mountains. This was mentioned in connection with the drowning of Forest Ranger E. House on the Clearwater forest during the season of 1914. Another sad accident occurred last fall, when Assistant Ranger Carlson on the Brazeau forest was drowned while endeavouring to cross the main Brazeau river. While it is undoubtedly true that men engaged in forest administration will always have to take certain chances in their work, it is just as certain that this branch should make every effort possible for the provision of safe crossing of the larger streams, at least at the more important points. Although the Elbow river is by no means one of the most dangerous streams, the crossing was considered as of such importance as to warrant the construction of a bridge.

Crowsnest forest.—Between 45 and 50 miles of new trail were constructed on this forest. Telephone work assumed considerable proportions in this reserve, a total of 45·7 miles being constructed. The line in question connects the Porcupine Hills section with the Trunk line running north and south from the Livingstone gap, inside the range. With the extension of the existing telephone lines in the Crowsnest forest, for comparatively short distances in various directions, this forest will be fairly well served with telephone communication.

Lesser Slave reserve.—Progress was made in the trail work, although it was not possible to complete the programme. A total of 64 miles of primary trail was constructed, of which a considerable portion can be travelled by wagon, and work was also done in the construction of auxiliary trails.

Cypress Hills reserve.—The most important improvement work in the Cypress Hills was the construction of complete headquarters buildings in the Battle Creek ranger district. Fireguards were constructed to a considerable extent throughout the reserve, and some repairs and alterations were made on some of the important trails.

Cooking Lake reserve.—Improvement work on this reserve was decidedly limited; good work was done, however, in bringing up to a higher standard some of the already existing trails.

General.—Summarizing the work done it may be stated that a total of about 440 miles of roads and trails was constructed; that 108 miles of telephone line were built; that one first-class ranger station house and numerous smaller buildings were constructed; and finally, that a considerable amount of work was done toward providing bridges, tool caches, lookouts, and other facilities. This and previous reports indicate the completion of a large amount of improvements, and to the casual observer it might appear that this district would be well provided with such facilities. One has but to travel through the forests, however, to really appreciate the tremendous volume of work which is still to be done, before the reserves may, in any sense, be considered as provided with sufficient trail facilities. As for the telephone work the next few years will necessarily involve the construction of hundreds of miles of telephone lines, ere the reserves will be sufficiently provided with that very necessary adjunct of modern forest protection—quick communication.

At this point I feel that some remark should be made with regard to the educative work performed by Professor W. N. Millar of the Forest School, Toronto, consulting forester of this branch. Two demonstration camps were held in this district, one at Morley and one at Coalspur. With the exception of the Clearwater forest every reserve of the district was represented at one or other of these meetings, and forest officers had the opportunity of hearing lectures on quick communication and of taking part in field demonstrations in telephone construction. Each camp involved about a week's time, and the interest in telephone work on the part of a considerable number of the men was given a very desirable impetus. The equipment which Mr. Millar had provided for the demonstration could scarcely have been improved upon, and I have little hesitation in stating that probably never before was such a complete and, at the same time, compact outfit gotten together for the purpose in view.

SURVEYS.

Aside from boundary work, previously described, no special survey work was conducted during the past year. During the three previous seasons substantial progress had been made in preliminary survey on some of the reserves, but a very great amount of work still remains to be done. A good topographic map is a fundamental requirement of forest administration; more particularly in the Rocky mountains there is a

very pressing necessity for such data, both for ordinary administration and fire protection. Within the past few years a topographic survey of the Crowsnest forest was conducted under the direction of the Surveyor General; the map resulting from this survey provides data which we should have for every forest. There are, however, a few points in connection with such surveys and maps where a little closer co-operation between the two organizations will result in more complete data and possibly a certain reduction in expense. It is with satisfaction that I look forward to the co-operation of the Surveyor General's Branch in this work.

EQUIPMENT.

During the past season progress has been made in providing the various reserves of the district with the equipment necessary for the various operations taking place. It will be realized that to provide reserves embracing areas of two or three million acres with sufficient equipment and tools for improvement work, and also to provide caches of tools for fire protective purposes, is by no means a small matter, nor one which can conveniently be handled during any one season. The policy has been to add, each year, as many as possible of the necessary articles of equipment, and before very long each reserve should be very well provided for in this respect. Toward the end of the fiscal year, especially, it was possible to take into account the requirements of the various reserves, and the probability is that this district will start into the new season in a much better position as regards equipment than has heretofore been the case. No new equipment has been developed, but more and more the standardization of equipment for forest reserve work is being approached.

TIMBER SALES AND SILVICULTURE.

During the year four timber sales, which had been in operation for periods of from one to three years, expired. Six new sales were started, involving the disposal of approximately 5,500,000 feet board measure of timber; over 90 per cent of this is fire-killed, the remainder being over-mature or defective green timber. While the lumber markets have shown a marked improvement during the past year this has not materially affected the disposal of timber from the forest reserves. The bulk of the timber disposed of by this branch in the Rockies consists of mining timber, and, as the coal-mining situation during the past year has, due to financial, transportation and labour difficulties, been anything but satisfactory, the utilization in this direction has not been so great as might otherwise have been expected. Detailed inspections of numerous sales were made by an officer definitely assigned to the timber sale work of the district. As a result of these inspections it was found that in some instances operators were not satisfactorily complying with the conditions of sale. Careful attention has been given to such cases, however, and the operators have been compelled to observe, to every reasonable extent, the conditions and requirements under which such sales were made. Timber sale work of this district is still confined to the Crowsnest, Clearwater, Brazeau, and Cypress Hills reserves, no development having as yet taken place on the Bow River, Athabasca, and Lesser Slave reserves. On the last named reserves there have as yet been no commercial mining developments, and there probably will not be much expansion in this direction until some of the mining properties are opened up and made commercially productive. The timber permit business of the past year was conducted along the same lines as previously, although an effort has been made to establish definite cutting areas, and thereby to confine cutting operations to areas where they are most necessary from the standpoint of improving the forest. By far the greater part of the timber disposed of under permit, also, is fire-killed.

On numerous occasions it has been pointed out that there are billions of feet *of* fire-killed timber in the Rocky mountains, for the bulk of which no scheme of utilization has been devised. Only an insignificant proportion of this timber offers any hope of being utilized as saw-timber; in fact, even for timber killed in the fires of 1914 the branch has been able to find no saw-timber market, and as the bulk of the dead timber was fire-killed during or previous to the summer of 1910 it will be appreciated that the branch cannot expect to enter the lumber markets with this class of material. While it will be possible to dispose of very limited quantities for fuel purposes it is evident that to a greater extent dependence must be placed on mining industries. In 1916 the amount of coal produced in Alberta was 4,648,604 tons; probably not more than twenty-five million lineal feet of mine-timber would be required in the production of this amount of coal. Assuming that the next eight years will witness an increase of 100 per cent in coal production, it would appear that in the neighbourhood of 300 million lineal feet of mine-timber, or, in round numbers, half a billion feet board measure, will suffice for coal-mining operations in Alberta until 1925. Even if dead timber were used in all the mines of the province, which is by no means the case, the branch cannot expect to dispose of more than a small proportion of the fire-killed timber to be found in the Rocky mountains forests. Dead timber is subject to serious deterioration in quality and usefulness from year to year, and, although the rate of deterioration is not so rapid in mining timber as in saw-timber, it is my opinion that a period of eight or ten years will probably place the bulk of the fire-killed timber beyond usefulness for mining purposes. The foregoing remarks indicate that, although the coal-mining industry is the only extensive outlet for fire-killed timber, operations for this purpose must be decidedly limited and, consequently, will be more or less confined to the more accessible blocks of timber. It must be recognized that the bulk of the fire-killed timber must rot where it lies ere it can be put to any use whatsoever. That, even under the most favourable conditions of mining development, it will likely be possible to dispose of only a small part of it is a fact which should make clear the necessity of taking advantage of every possible outlet. The policy should be to reduce, so far as possible, the ultimate amount of waste as a result of fires of the past. To some of these points attention has been given during the past year, and during the coming year it is the intention to carry on further studies with a view to securing an extension in the use of fire-killed timber. Needless to say, if such markets are to be developed it is necessary to offer the products to the consumers under the most advantageous arrangements possible.

During the year steps were taken for the collection of data and the preparation of rough maps which will show the various forest types in the Rocky Mountain forest reserve. With rather a limited and untrained staff the results can by no means be considered as accurately representing conditions; nevertheless, before long there should be completed a map which will show roughly the conditions which exist. Incidentally, the training which is given to the forest officers in work of this kind is of great value from an educational standpoint.

GRAZING.

No great development in connection with the grazing on forest reserves of the district can be reported for the past fiscal year, this to a certain extent being due to the fact that it has not as yet been possible to provide for the assignment of a grazing assistant to develop this particular line of work. While on two or three of the reserves a certain portion of the range has been used for a great many years, and, therefore, there are always applicants willing to range their stock on the reserve, there are other reserves where the available range is considerably removed from the settlements, and consequently the settlers have not become familiar with the grazing

facilities obtainable. Even on the reserves quite accessible to the settled country it appears that the settlers are not yet sufficiently familiar with the situation to take advantage of all the range which is available. It will readily be perceived that the best way to bring this range into conservative use is to have a thorough reconnaissance made of the grazing resources, and to have a well-qualified man assigned to the work of developing the grazing business. Undoubtedly the present conditions have curtailed the expansion in the stock-raising industry which, normally, might have taken place. While I am not in a position to quote figures on the general stock situation in this province, it is clearly evident that the settlers in the country accessible to the forest reserves have not been able to increase their holdings very much, and, in fact, in some cases there have been considerable reductions. A total of approximately 6,500 head of stock was grazed under permit on all reserves of the district. Of this number a little over 80 per cent were cattle, the remainder being horses. Although a certain amount of range in the Crowsnest pass was reserved for sheep, no advantage was taken of the facilities offered, owing to the prejudice which existed against sending sheep by railway to the Crowsnest pass.

When one takes into consideration the very extensive grazing resources of the numerous forest reserves in Alberta it is regrettable that the total number of stock handled should be confined to the rather insignificant figure quoted above; on some reserves there are grazing resources which are practically untouched. Present indications are that in some places there will be a very marked increase in the stock grazing on the reserves during the coming season. In the Rocky Mountains forest reserve there are thousands upon thousands of acres of range which might readily be put to conservative use if it were possible to stock the range with sheep. Unfortunately, however, there stand in the way certain difficulties which it is not possible to overcome immediately. So far as possible, however, this important question is being considered, and for the coming season it is hoped to be able to make at least a small start in connection with sheep grazing on the reserves.

Due to the abundant rainfall which was experienced throughout the Rocky mountains the range was in excellent condition for the grazing of stock. Reports indicate that in nearly all cases the stock came off the range in excellent condition, and in no case has any evidence been received of over-stocking having taken place. I am pleased to state, also, that no reports have been received indicating any extensive losses of stock due to poisoning. It will be remembered that some difficulties of this kind were experienced, particularly in the Crowsnest forest, two years ago. In this respect, however, the past season has been entirely successful, as more detailed attention has been given to the choice of grazing periods and, where necessary, stock has been kept off the range at such times as the poison weeds are most dangerous.

USES.

Commercial uses of the forest reserves have to a certain extent been discussed under other headings. The war conditions are undoubtedly responsible for a retardation in commercial activities within the reserves. Probably the greatest commercial development which may be expected is that of coal mining. This industry is, of course, more or less tied up with railway facilities, and, although there are railway lines projected into the various coal-fields, construction has been delayed by financial conditions. No new railways have been constructed during the past year, although we have indications that a start may shortly be made on the Smoky Valley and Peace River railway which will traverse a portion of the Athabasca forest. Townsites within the reserve are also dependent to a very great extent on the progress in coal-mining operations and, consequently, none has been laid out or applied for during the past year. Recreational use of the forest reserves has, also, been retarded by conditions. The only summer resort in the forest reserves of the

district, namely, that at Elkwater lake in the Cypress hills, is still utilized only to a very small extent. With the exception that three or four lessees have constructed small cottages there has been no development at all. It will be appreciated that under conditions such as the present there are, comparatively speaking, but few persons living at a distance who can take advantage of the recreational facilities offered in the forest reserves, and while as usual there have been a considerable number of hunting, fishing and camping parties, there has been no increased use in this direction. Numerous reserves offer particularly advantageous attractions, and with the considerable progress which has been made in road and trail construction, whereby various portions of the forest are made more easily accessible, there should be a very considerable increase in the number of persons from the surrounding country and also from the towns and cities of the province resorting to the forest reserves for recreational purposes. Particularly good opportunities are offered to fishermen and hunters, as well as to those who merely desire to spend a period of quiet camp life in the woods.

FIRE-RANGING.

The organization for forest protection on Dominion lands not included within the forest reserves is divided into four main fire-ranging districts, namely, Edmonton, McMurray, Slave, and Mackenzie River. Although some minor changes were made, involving to a limited extent the redistribution of patrols, the general organization remained the same as in the previous year. Work in the Edmonton district involved the employment of a staff of about forty men. About fifteen men were employed in the McMurray district. The Slave district was patrolled by two steamboats each manned by a crew of from three to four men, supplemented in one or two cases by canoe patrols. Work in the Mackenzie district was not very extensive and consisted in operations, more or less of an educational character, carried on by a staff of four men acting under the direction of the Government agent at Fort Simpson. Owing to the weather conditions which prevailed, the McMurray, Slave, and Mackenzie River districts suffered comparatively little loss from fire. In parts of the Edmonton district, however, notably the Peace River country, there were periods of considerable fire danger, and a total of 247 fires is reported, of which 25 covered an area of more than ten acres. The total area burned over appears to have been in the neighbourhood of 40,000 acres, the bulk of which was grass land and old "burn"; only about 5 per cent of the total area was covered with desirable young growth or merchantable timber. Out of a total of 247 fires the causes of 113 were not determined; 63 were caused by campers and travellers; 51 were caused by the operations of settlers in clearing land, etc.; 16 are attributed to railways; and 4 are reported to have been of an incendiary nature. While the weather conditions which prevailed in the Peace River country were more dangerous than obtained elsewhere on the northern forest reserves, the large number of fires which occurred is indicative of the situation which may be expected in any country where settlement is in the development stage. During the past few years it has been necessary, in order to avoid serious conflagrations, to maintain a more or less extensive patrol of the whole country. As the country becomes more settled, however, the most logical solution of the fire situation is, so far as possible, to withdraw the efforts to lands which it is desired to consider permanently as forest reserves and, in confining attention to such areas, to make them just as fire-proof as possible. This involves not only the provision of more intensive patrol but also the development of the various tracts, by providing trails and other means of communication so essential to efficient fire protection. While the control exercised over the fire situation by the present staff and organization has probably justified the expenditure, just as soon as possible the effort should be confined to definite areas over which the branch can absolutely control all operations under the Forest Regulations.

With regard to the McMurray and Slave districts a special inspection was made by Mr. J. A. Doucet under the direction of this office. This officer spent two or three months in detailed inspection operations in that country. As a result of this work it is expected that the branch will be able to make an entire reorganization of the fire-ranging operations in both these districts. Previously I have pointed out the necessity of providing for closer supervision of the operations in that country, and it is hoped that by an amalgamation of these two districts and the assignment of a competent man in charge of both, whose exclusive duties will be those of fire protection, a very material improvement will be made in the organization.

RAILWAY FIRE PROTECTION.

In co-operation with the Board of Railway Commissioners for Canada notable progress was made in fire protection along railway lines. Railway work in this province was again supervised by District Fire Inspector McNaughton and his two assistants. Both the Canadian Northern railway and the Grand Trunk Pacific railway took active steps in connection with right-of-way clearing. In connection with the Grand Trunk Pacific railway I am glad to report that there has been marked development in the efficiency of the patrol organization. In my last report I indicated that their patrol organization had been entirely unsatisfactory. The past year, however, witnessed a notable change in this direction, and a good patrol was maintained. I regret that I cannot present a similar report in connection with fire protective measures taken by the Edmonton, Dunvegan and British Columbia railway. Last year I indicated that there had been a very decided improvement over the previous season. For some reason or other during the fire season of 1916 the branch was not able to secure such satisfactory service. Toward the close of the fiscal year strong efforts were made to provide for a thorough cleaning up of the right of way on this particular road, and the situation during the coming season will to a very large extent depend upon the success which rewards these efforts. Detailed reports have previously been submitted to the Director of Forestry, indicating very clearly the exceedingly dangerous condition on some portions of the right of way. It is perhaps unnecessary to point out that a combination of these conditions and a fairly dry season would create a situation with which it might be exceedingly hard to deal. A large number of fires occurred along this line during the past season, and it is more a matter of good fortune than anything else that a very large portion of the country was not burned over. Every effort will be made to secure a thorough compliance with all the fire protective requirements, in order that this railroad may be brought to completion without such evidences of wanton destruction as are to be found along some of the older established lines. In the territory through which new construction was carried on last season the fire prevention efforts of the branch were very successful, and it is hoped that this experience may be repeated.

EDUCATION AND PUBLICITY.

No extensive programme of publicity work has been undertaken during the past year, owing to the exceedingly limited staff. It was not possible to provide for a series of lectures and meetings for the purpose of bringing the public into closer touch with our work. A considerable amount of educational work has, however, been done in a smaller way, by means of the use of various advertising materials, so that it is felt there is a little more appreciation on the part of the public as to the value of the work. When it is possible to advertise more extensively the facilities at the disposal of the public, both commercial and recreational, in the forest reserves, we may expect that principles underlying the establishment of the reserves, and the necessity for protection and rational use of the forest resources of the country, will be more fully appreciated.

E. H. FINLAYSON,
District Inspector of Forest Reserves for Alberta.

APPENDIX NO. 5.

This report concerns the work done in the British Columbia inspection district for the fiscal year 1916-17.

The fundamental basis and all-important feature of Forestry Branch administration in the Railway Belt of British Columbia is adequate and efficient protection of the forests from fire. During the past year the interrelation between the forest resources and the economic condition of the people of British Columbia has been brought out by the fact that the stimulation of forest industries has resulted in a returning prosperity to all classes of the population. This fact has been impressed upon the public by newspapers and public men, with the result that the people as a whole are more in sympathetic touch with the value of our work than ever before.

The forest resources of the Railway Belt in British Columbia are large and, owing to proximity to transportation, these forests are inevitably destined to be the first utilized in the great world demand which the termination of the war will inaugurate. The importance of adequate protection as an insurance for future raw materials is, therefore, manifest to all.

During 1916 weather conditions favoured the work of fire prevention very greatly. Partly owing to this fact and partly due to increased efficiency of personnel all along the line, both the number of fires reported and the fire damage in 1916 were the smallest yet recorded. There were fought 272 fires, or approximately 60 per cent of last year's number. The total damage resulting was reduced from $15,675 to $1,826, a splendid record.

The fire statistics for the past year throw an interesting light on the greater efficiency of patrol. The percentage of fires of unknown origin, which has steadily decreased since intensive administration was established, has this year reached the lowest stage yet, 25 per cent. Railways, from being the greatest menace to the forests, have reduced the percentage of fires so much that they have fallen to the bottom of the list, largely through the excellent patrol system established by authority of the Board of Railway Commissioners.

The higher percentage of forest fires due to fires left by campers, 22 per cent, indicates the need for still further educational work. Fires caused by lightning assume a relatively higher percentage than ever before, 20 per cent. During the past year despite the great decrease in fires recorded there was an increase in the absolute number of fires caused by lightning.

FOREST RESERVE ADMINISTRATION.

The forest reserves established in the dry belt portion of the Railway Belt owe their origin not mainly to the conservation of the timber resources thereon, which are relatively less important, but to the necessity of protecting the watersheds of innumerable rivers and creeks whose water, used for irrigation, is absolutely essential to the well being of this part of British Columbia.

A proper realization of this fact is being gained by the public at large and, together with the settlement of the agricultural lands difficulty, is dissipating adverse criticism of forest policy and administration. It would appear that we are coming appreciably nearer the goal sought, namely, full sympathic support by all sections of the community.

As set forth in detail in my report for 1915-16 it is urgent, if the Forestry Branch is going to guarantee to the public a proper fulfillment of the functions delegated to it, that additional watershed areas should be placed under permanent forest reserves.

The further development of favourable public opinion mentioned above has also been aided considerably during the past year by increased use of forest reserves, both in regard to resources in timber and hay, and for recreation in camping and fishing at Trout and Paul lakes.

There is in these two lakes what was described at the annual meeting of the Kamloops Fish and Game Protective Association as probably the most wonderful fishing on the continent of North America. The Forest Reserves regulations in regard to fishing are conserving this sport, and together with occasional restocking of the lakes by the Fisheries Branch will guarantee an unsurpassed attraction for tourists from all parts of the world.

The summer resort at Trout lake in the Long Lake forest reserve is growing in popularity yearly. Recently a very largely-signed petition was received asking for the establishment of a similar resort at Paul lake in the Niskonlith forest reserve, and it is hoped that action may be taken in regard to this matter during the coming year.

AGRICULTURAL LANDS.

Some mention should be made in this report of the procedure authorized in respect to the granting of homesteads in forest reserves. I mentioned in my last report the difficulty which had arisen in this district as a result of the retention of some lands of value for agriculture in the forest reserves, despite recommendations made over two years ago for their elimination. The arrangement for recognizing the rights of settlers or applicants for entry for such lands has largely removed this difficulty. Under this arrangement lands are not taken out of the jurisdiction of this branch until application for entry has been made, even though recommendation has been made by this branch for their elimination from the forest reserve.

This procedure while not in accordance with the policy advocated in my report for 1915-16 is probably a fair compromise. As it is a plan of administration co-ordinated with the Dominion Lands Branch, and having the support of the general public, I consider that it is of very great value in forwarding the ends desired in forest policy, namely, efficient administration backed by the full support of all classes of the public.

GRAZING.

No further steps have been taken to establish grazing regulations on the forest reserves of British Columbia. Considering the present reduced condition of the staff it is probably necessary that this matter should be held in abeyance until after the war.

In my report for 1915-16 mention was made at some length of proposed regulations for the use of hay meadows on forest reserves. These regulations had the approval of the Interior Stock Breeders' Association and have been put into effect by Order in Council of December 19, 1916. Many applications for the use of meadows under these regulations have already been received and it is expected that much good will result, not only in increased prosperity to the grazing industry but also in a better understanding of the purposes of the reserves. The availability of these meadows for use will remove another of the criticisms sometimes made that the setting aside of forest reserves results in locking up natural resources and in preventing the development of the community.

FOREST INVESTIGATION.

Advantage has been taken of the application for sale, under the Forest Reserves regulations, of a large tract of timber of a sub-alpine type, on the summit of the Fly Hills forest reserve, to employ the regular forest rangers on a forest survey under the direction of Forest Assistant K. G. Wallensteen. This party while making the necessary examination preliminary to disposal under timber sale are also making the start in scientific silvical investigation, in this district, of this spruce-alpine fir type. This type covers large areas of the forest reserves and has in the past clothed practically all the summits of the interior plateau of British Columbia. This study is along the lines suggested by Mr. H. C. Wallin in his memorandum of January 2, 1917, advocating forest plan investigations, and should add considerably to the data now available on this type. This work also serves as a very valuable experience to the forest rangers employed. While no definite reports have been turned in as yet I am very well satisfied with the results obtained as shown to me during a recent visit to the scene of operations.

IMPROVEMENTS.

The favourable fire season permitted the giving of a great deal of attention to improvement work on the forest reserves. Practically all the rangers were thus employed either on new projects or on maintenance of existing ones for the greater part of the season. As a result most of the reserves are now completely equipped with the necessary trails, telephone lines, lookout stations, headquarters stations, and cache cabins. Special attention was paid to the last named, thirteen cabins being erected for storing fire-fighting equipment and to serve as stopping places for rangers on patrol. The district is thus in the fortunate position of being able to accept the reduction of allotments for the coming season and consequent cancellation of improvements with a fair assurance of success in combating fires.

PUBLICITY.

Although the exigencies of a much reduced staff prohibited the personal attention of forest officers to public education in the value of our work, still a great deal of good was accomplished among school children by the distribution of rulers and blotters bearing appropriate inscriptions, and among users of the forest by the distribution of whet-stones, and by placing blotters in hotels, banks, etc. Articles bearing on forest administration were also written for the newspapers from time to time.

EQUIPMENT AND SUPPLIES.

Further additions to the fire-fighting equipment available were made during the year, principally for storage in the cache cabins mentioned above.

FIRE PROTECTION ON DOMINION LANDS.

The organization of fire protection on the forested areas within the Railway Belt, outside of forest reserves, differs from the work explained above in several essentials:—

(1) The object to be attained is not the protection of watershed areas lightly covered with inferior tree species but the conservation of merchantable timber resources whose value is direct rather than indirect;
(2) The system of patrol is not so intensive, nor have the ranger districts been opened up by improvements in communication and transportation to nearly the same extent;

(3) Administration of fire permit regulations, supervision of burning of settlers' slash, and the situation of fire-ranging districts close to the settled areas of the Railway Belt bring the fire rangers into much more intimate contact with the general public than is afforded to the forest rangers on reserves in the discharge of their duties;
(4) Appointments to the fire-ranging staff are only temporary instead of permanent as they should be to get the best results.

It will be seen readily that conditions 2 and 4 operate adversely in any endeavour to secure maximum efficiency. The general public, and particularly the lumbermen whose vital interests are at stake, find it hard to understand why the Forestry Branch should expend its best efforts on the least productive areas, the forest reserves, rather than in alleviating the conditions mentioned above, which undoubedly detract from the value of the protection afforded the merchantable timber areas, most of which are held under license as timber berths.

It has, therefore, seemed advisable to put on record here some of the considerations which have affected the origin and development of the present system of fire protection established by this branch, namely, the forest reserve and the fire-ranging administrations. In the first place it should be understood that the latter system is an adaptation of the original organization established by the department when the Crown Timber agents were charged with the supervision of the fire-ranging staff. As the organization of the Forestry Branch was extended this work was gradually taken over by it, but in a large number of cases the actual field work continued to be handled by the Crown Timber agents, who reported on all matters relating to fire protection to the Superintendent of Forestry. A later development of the organization consisted in the appointment of separate chief fire rangers, in place of the Crown Timber agents, as supervising officers of the ranger staff. Later, on the setting apart of forest reserves in certain sections of the West, a separate field staff was organized for their management along the lines followed by the United States Forest Service. At the present time it may be considered that the whole work is in a transition stage. As further forest reserves are created the field organization is readjusted to conform to the altered status of the lands protected. The extension of the area under forest reserve, by parliament, has in general followed the spread of public sentiment in favour of adequate conservation of national resources. Consequently, action has been not continuous but intermittent and irregular. This is as it should be, for it is a fundamental axiom of democracy that governmental action to be lasting and effective must either follow public demand or result as the outcome of an educational campaign adequate to bring public opinion to the point where it will agree to and approve of radical changes in national policy. The experience of this branch has shown that where the people of this country realize that the welfare of the basic industry of Canada, namely agriculture, is directly concerned there will arise automatically from the people themselves a demand for action on the part of the government adequate to meet the situation. Where the connection is not directly apparent or where subsidiary industries are concerned there is a tendency to public indifference to the administration of natural resources, which may easily be fanned into opposition by self-seeking exploiters unless an educational campaign is waged by those having the ultimate good of the country, as a whole, at heart.

This aspect of the public thought is illustrated by referring to the conditions relative to the origin of the forest reserves in British Columbia and on the east slopes of the Rocky mountains in Alberta. In this province the initiative came from the community, in a request to the department to protect the watersheds of streams used for irrigation purposes by creating forest reserves. In Alberta the forest reserves were established as a result of an educative propoganda which impressed upon the thinking men of the Prairie Provinces the correlation between the mountain forests and the stream flow of the great rivers of the prairies.

It is necessary that a distinction be drawn between the nature of the country patrolled under the fire-ranging organization in the Prairie Provinces and in the Railway Belt of British Columbia. In the former instance, while there are undoubtedly areas which should be included in forest reserves, there are also large areas, particularly in the north country, where settlement is so remote and the timber so scattered and inaccessible as to make it probable that for a very long time at least these districts can best be handled by a loosely organized fire-ranging staff appointed for the danger season only. In British Columbia, on the other hand, the fire-ranging districts comprise areas containing either valuable stands of merchantable timber or well-established reproduction of calculable value, which should be given the utmost protection possible. Both transportation facilities and growth condition render the forests in this district, whether mature or in the younger age-classes, the hope and mainstay of future development in the lumbering industry. Consequently, the fire-ranging organization can only be considered as a temporary makeshift to fill in the gap till public sentiment forces the proper and necessary action, namely, the setting aside of all non-agricultural lands within the Railway Belt as forest reserves, with full administrative authority, a permanent staff, and an adequate improvement system developed on the ground.

The consummation of this plan is hindered both by the present state of public sentiment and by the interior organization of the department. As regards the former, I have mentioned in former reports the agitation raised against the forest reserve policy on the charge of locking up agricultural lands which, though largely unfounded, yet remains an obstacle not entirely overcome. Concerning the latter it is only necessary to refer to the address of Dr. B. E. Fernow on "Co-operation in Forestry" delivered at the sixth annual meeting of the Commission of Conservation, and printed on page 120 of the annual report of the Commission for 1915. It is doubtful if the creation of forest reserves and the application of reserve administration over these merchantable timber areas would result in any considerable reduction in the fire hazard, unless the management of the logging operations on timber berths were carried out in accordance with correct forestry practice as regards brush disposal. Such a reorganization of the department would appear to be a necessary corollary to the establishment of forest reserves over the remaining non-agricultural lands within the Railway Belt, as it offers, naturally, a relatively greater obstacle to further progress along this line than the mere obtaining of legislative action with respect to the status of the lands involved.

Such a broad increase in the scope of the functions of this branch could not be carried out without a considerable increase in the staff both of technically trained foresters and competent men of experience in logging operations. Under present conditions it is doubtful whether the necessary staff could be obtained.

Provided, however, that the solution of this difficulty is arranged for I do not anticipate serious objections to such a reorganization on the part of the lumbermen operating in the Railway Belt, who comprise the section of the public most intimately concerned.

I think it might be safely stated that the lumbermen of the Railway Belt are not averse to paying out large sums of money on fire protection of their limits, providing they can be shown that an improvement in the fire risk results from more intensive organization and larger expenditure on the part of the Government. This view has been expressed publicly several times by lumbermen at the annual meetings of the fire rangers.

Whether or not new forest reserves, with their attendant necessities for increased staff, are established in the near future, it is time that thought be given to the matter of future appointments to the staff. The Order in Council directing that preference in all appointments be given to returned soldiers brings up the question of the necessity of establishing some safeguards to guarantee efficient officers. While no one can disagree with the policy of preferential treatment of our returned soldiers, yet the public interest requires that all officials should be fully qualified for their duties. I

am of the opinion that the Government should go a step further in so far as appointment of forest officers is concerned and, following the procedure established in Europe, establish a vocational school to train returned soldiers for forest work. It is essential that only physically fit men be allowed to take such a course of instruction. From graduates of this school all necessary appointments could be made, so far as the number of men available would permit.

The routine work of the fire-ranging staff in this district during the past year was conducted in the same manner as detailed in previous reports. The generally favourable fire season, and close attention to work on the part of the rangers, resulted in very inconsiderable losses, as mentioned above.

In the Coast district, owing to the clearing off by lumber companies of several berths, resulting in the closing down of operations in the localities affected, it was found possible to reduce the number of rangers by two, leaving a total of twenty-one. Advantage was taken of favourable weather conditions to burn a large accumulation of logging débris, and to encourage and assist settlers in clearing up their slash. The Lookout Mountain lookout station, completed early in the season, gave first-class service and will undoubtedly be a great aid in preventing damage from forest fires.

Meetings of the rangers held in New Westminster at the opening and close of the fire-ranging season were productive of very interesting discussions and many practical suggestions for improvement in method.

In the Salmon Arm district it was necessary to increase the staff of rangers by two owing to the demands of the burning-permit business, bringing the number of men employed in the district up to eighteen.

One extra ranger was also employed in the Revelstoke district to provide an adequate protection to the great timber areas in the Spillamacheen River watershed, hitherto largely neglected.

In both these districts the settlers were co-operated with in the matter of burning brush. In most cases the ranger issuing the permit superintended the actual burning, a consideration which the settlers in general seem to have appreciated very much.

Publicity material distributed by rangers in all the districts has been of immense assistance in keeping the matter of forest protection constantly before the public.

A very enthusiastic ranger meeting was held in Revelstoke in October at which each of the rangers present contributed experiences and suggestions for the betterment of conditions in his particular district. Such meetings are of distinct value, not only in encouraging *esprit de corps* amongst the staff but also in providing a clearing-house for data, much of which is worked into the administration procedure in succeeding years.

RAILWAY FIRE-RANGING.

Co-operative work in the supervision of railway patrols, under General Order No. 107 of the Board of Railway Commissioners, was handled in the same manner as formerly, with excellent results. The railway companies concerned, namely, the Canadian Pacific Railway and the Kettle Valley Railway, gave the most careful consideration to all requests for action, and the only failures were due to labour conditions rather than to any disinclination on the part of the railway officials to conform with requirements.

The two suggestions made by myself to the Chief Fire Inspector of the Railway Board, which I consider would further increase the efficiency of fire prevention, have not been acted upon as yet, as he considers the time inopportune to lay further burdens upon the railway companies. They are, first, that all windows of smoking compartments of cars be screened to prevent the throwing of cigar or cigarette butts out of the train; and second, that when only one round trip per day is specified for section patrols that such patrol be performed in the afternoon. Records of the past few years

show that an increasing number of fires are attributed to careless smokers on trains and, also, that most railway fires start or spread after mid-day. It is advisable that some action be taken along these lines in the future.

Co-operative work was also performed with the British Columbia Forest Branch in the supervision of railway patrols along the Canadian Northern railway, which was under provincial jurisdiction. Patrol measures were specified by myself early in the season and were carefully carried out by the company, as were also all suggestions for right-of-way improvements.

Thirty-three fires were attributed to railway causes during 1916, a reduction of 20 per cent from the preceding year. Of these about 80 per cent were set by coal-burning engines. No fires were reported as being set by oil-burning locomotives.

D. ROY CAMERON,
District Inspector of Forest Reserves for British Columbia.

APPENDIX No. 6.

This report concerns the progress of work in the Forest Products Laboratories of Canada for the fiscal year 1916-17.

Perhaps the most encouraging development during the year has been the widespread recognition of the place which scientific institutions must take in the systematic utilization of a country's natural resources. This, in turn, has been a stimulus to the Forest Products Laboratories in planning investigations on a comprehensive basis, and in organizing the division with more faith in the ultimate value of the work and with more confidence in the fuller co-operation which may be expected between this division of the Government service and the wood-using industries.

The progress of work in the laboratories has been considerably hampered by the absence of members of the staff on active service and the loss of others who have gone into munition work. The Division of Timber Tests has been at half strength, and the nucleus of the Division of Wood Preservation was disturbed by resignations for war work, without the opportunity of building up this division very far under present conditions. The Divisions of Timber Physics, and Pulp and Paper have been more fortunate. Important progress has been made in most of the lines of investigation undertaken in the laboratories, and a special effort has been made to safeguard the basic organization and lay plans for more effective work when the pressure of war is relieved.

LIBRARY.

Library accessions during the year totalled 469, including books, pamphlets, government bulletins, etc. The total number of books on hand is 669, being an increase of 208 for the year. In addition to the above, 39 technical journals and periodicals have been received and indexed regularly. Progress reports of investigations are prepared monthly for the library and a number of special reports on tannins, potash from wood ashes, resinous wood distillation, wood flour, etc., have been filed. It is quite apparent that the library division has possibilities for increased usefulness in the way of carrying out literature studies, preparing concise reports on special subjects, working up miscellaneous articles for publication, and, in general, collecting information on forest products from all available sources and disseminating the same in proper form for the benefit of the Canadian public.

EXHIBITS.

During the year 36 trunk-bark specimens were prepared from logs of Canadian species for permanent exhibit at the laboratories. The preparation of sets of hand specimens has been going forward, about 600 specimens representing 11 species being finished by the end of the year. Suitable labels for 56 Canadian species have been ordered and it is the intention to distribute these labelled hand specimens of Canadian woods to schools and other institutions throughout the country. Process exhibits are in preparation to illustrate the raw materials, intermediate products, and final products in various wood-using industries. A set of specimens representing Canadian woods suitable for toy-making was prepared. A very fine collection of Canadian pulp and paper samples was placed in the care of the laboratories by the Canadian Pulp and Paper Association. The British Columbia Forest Branch has furnished an exhibit of western woods in finished form.

TIMBER PHYSICS.

A special bench for microscopical work, a large cabinet for storage of specimens, a work desk, etc., have given improved accommodation for this division. The equipment and supplies added during the year include microscope accessories, microtome knife, micrometer, electric drying oven, photographic supplies, and special chemicals.

The main work of this division has been the determination of physical and structural properties of the woods which have undergone mechanical test in the Division of Timber Tests. The special investigations discussed under "Testing Clear Specimens," "Drying of Wood," and "Fibre Measurements," show something of the scope of this work. Miscellaneous activities have included the working out and publishing of a new method of staining wood fibres, the replacing of celloidin by pyroxylin as an embedding material in mounting slides, the preparation of special reports on structural timbers, tannins, etc., and the distribution of 481 special slides of Canadian woods and fibres to 18 companies and other laboratories. The work of the division may be summarized as follows: Moisture determinations, 1,449; structural characteristics, 486; radial and tangential shrinkage, 75; specific gravity and volumetric shrinkage, 171; permanent microscopic slides, 379; duplicate slides, 1,448; temporary slides prepared and examined, 575; wood identifications, 108; fibre identifications, 119; fibre measurements, 12,680; special fibre mounts for use with lantern, 12; ordinary negatives, 159; photomicrographic negatives, 130; photographic prints, 1,218; copies, 114; lantern slides, 103.

TIMBER TESTS.

The saw-mill has been transferred from the outskirts of the city to the yard of the laboratories. A new storage shed has also been built to relieve the congestion in the Division of Timber Tests as well as in the other divisions. One testing machine of the McGill laboratory previously available for our use has been taken over by the Imperial Munitions Board for testing war materials.

The main work of the division is covered under "Testing Clear Specimens" and "Nova Scotia Mine Timbers" in the discussion of special investigations. Other miscellaneous tests were made from time to time in order to provide data necessary to answer specific inquiries received, and in co-operation with the work of other divisions. A tentative outline was drawn up for a series of strength tests on Douglas fir timbers in structural sizes, in co-operation with the British Columbia Forest Branch.

PULP AND PAPER.

The paper machine room and chemical laboratory were greatly improved by constructing a tintometer room, paper-testing room, office, benches, experimental beater

outfit, etc. Among the new equipment may be mentioned a measuring tank, pulp slowness tester, condenser, storage battery, mercury arc rectifier, hydraulic pressure pump, Ives tint photometer, water motor, pressure regulator, and chemical apparatus.

The main work of the Division of Pulp and Paper is covered under "Waste Sulphite Liquor," "Beating of Pulp," "Blotting Paper," "Pulpwood Measurements," "Chemistry of Wood," and "Sulphite Pulp," in the discussion of special investigations. Considerable time has been spent in perfecting the designs for the proposed experimental pulp-mill in co-operation with members of the Advisory Committee. A number of minor investigations have been carried on, mainly in order to make the unusual facilities of the experimental paper mill available to those working out special problems in this field. These include the comparison of steel and stone rolls for beating leather-board stock, runs on paper sized by the "Waxine" process, the effect on pulp stock of long standing, the testing of a hydrated pulp and new paper filler, the bleaching qualities of certain pulps, the conversion of spruce planer shavings into sulphite pulp, the testing of absorbent paper for filtering oil, and the collecting of information on decayed balsam fir in pulpwood areas.

WOOD PRESERVATION.

In the laboratory for preservative treatment of wood the treating cylinder was provided with more condenser capacity, the steam and air lines were rearranged, recording instruments were installed, two storage tanks for oil were constructed, a large drying oven provided, and a number of miscellaneous items of equipment added. The pathological laboratory was improved by constructing a large cabinet for specimens, completing the fitting up of the fungus pit, etc.

The main work of the Division of Wood Preservation is covered under "Ties," "Paving Blocks," "Fence Posts," and "Durability of Wood," in the discussion of special investigations. Miscellaneous work has been done on the analysis of various preservative oils, impregnation of various woods with an emulsion of creosote oil and rosin soap, penetration tests with a special coal tar sample, the effect on flexibility of soaking elm in common salt, investigation of methods of accelerating the fruiting of wood-destroying fungi, examination of railway ties in the track to compare the relative importance of decay and mechanical wear, designing a new humidity apparatus, and collecting samples of wood preservatives and wood-destroying fungi.

MISCELLANEOUS WORK.

As mentioned in my last annual report, the problems concerning lumber deserve more attention than we can give them with the present staff, and a separate division should be established to deal with them. This industry is, of course, the largest consumer of forest products, but being scattered throughout the country there is great difficulty in keeping in touch with its developments. The solution of its problems frequently depends to a very large extent on local conditions, and unless these can be studied by competent men on the spot proper assistance is impossible. The efficient utilization of many forms of wood waste, for instance, depends largely on an intimate knowledge of manufacturing conditions in all wood-using industries, which can only be obtained by first-hand investigation. Problems concerning the development of new lines of manufacture can only be studied in the light of accurate trade information. Some organization is necessary, also, to bring lumber dealers, and wood users generally, into closer touch with the information available to them in these laboratories.

Problems connected with the wood distillation industry have been prominently before us during the past year. Considerable work was accomplished in making available for cordite manufacture substitutes for acetone derived from the products of hardwood distillation. Part of the tar produced in this process has also been found of value

as a substitute for imported pine oil used for ore flotation. As this tar creosote was previously burned for fuel the new use, if it works out as experiments indicate, will be of considerable advantage to both the mining and wood-distilling industries. The distillation of resinous woods, particularly red pine stumps and western yellow pine, has also received some attention but the work shows no prospect that this industry will become of early importance, since the yields of valuable products are low compared with those obtained from southern yellow pine.

Some little attention has been paid to the tannin extract industry and it seems likely that the collection of more complete information in regard to Canadian conditions in this matter would be of value. It is expected that something in this connection will be done during the coming summer.

Considerable interest has arisen of late regarding the manufacture of wood flour of grades suitable for use in dynamite manufacture. Practically all the wood flour used in America is imported from Norway but there is no reason why its manufacture should not become a Canadian industry since the requirements are simply cheap power and clean wood waste, particularly of spruce and white pine.

Besides the regular work in the divisions now operating, members of the staff have kept in touch as much as possible with all phases of work connected with forest products, with the result that information is now available on practically every question which may arise.

SPECIAL INVESTIGATIONS.

Testing Clear Specimens.—This is a comprehensive investigation to provide reliable data on the mechanical, physical, and structural properties of all the important Canadian woods. Test specimens are of rather small sizes and are cut in such a way as to be free from defect. The mechanical tests are static bending, impact bending, compression parallel to grain, compression perpendicular to grain, hardness, shear, cleavage, and tension perpendicular to grain. The physical tests include moisture content, specific gravity, volumetric and linear shrinkage, per cent sapwood, per cent summerwood, rate of growth, and microscopic structure. The extensive test results on Douglas fir were assembled for publication as Forestry Branch Bulletin No 60 "Mechanical and Physical Properties of Canadian Woods—Douglas Fir". During the year five shipments of material were tested: black spruce, the so-called "grey" spruce (really black spruce), and white spruce from Quebec province; and white pine and red pine from Ontario. The mechanical tests totalled 1,042, moisture determinations 1,163, structural characteristics 446, radial and tangential shrinkage 75, specific gravity and volumetric shrinkage 116. In general, black spruce is somewhat stronger, stiffer, and tougher than white spruce; red pine is much stronger, harder, stiffer, and tougher than white pine. Red pine has also proved to be stronger in most respects than black spruce.

Nova Scotia Mine Timbers.—The strength tests on 270 props and booms in the green condition were completed in the summer of 1915. The duplicate specimens which have been allowed to season are now being tested in the air-dry condition, 60 booms being finished by the end of the year. Props are tested in 6-foot lengths as columns, and booms are tested as beams on a 12-foot span. Half of the specimen logs were seasoned with the bark intact and half peeled. The comparative rates of seasoning have been determined and it is expected that the tests will provide interesting data as to the value of peeling mine timbers before storing in the yards. The species under examination are black spruce, red spruce, balsam fir, yellow birch, white birch and jack pine.

Drying of Wood.—Modified plans have been drawn up for a rather comprehensive study of the drying of wood. A start has been made towards determining the fibre saturation point of five coniferous woods. It is intended to study the relation between

shrinkage and moisture content, the variation of moisture content with changing humidity of the atmosphere at different temperatures, the rate of drying, and other factors which play such a large part in the proper choice of wood species for particular purposes.

Waste Sulphite Liquor.—No further experimental work has been attempted in this field but considerable time has been spent in making a literature study. By abstracting the technical articles which have appeared since work on waste sulphite liquor was first started, and classifying these in such a way that literature on various phases of this subject can be readily located, it is hoped that a publication can be turned out which will be a valuable reference for those connected with pulp and paper making, and which will also serve as a basis for experimental work that will be necessary in order to promote utilization of this enormous by-product.

Beating of Pulp.—A considerable amount of work has been done during the year in the study of the factors connected with the proper beating of paper pulp. Information has been obtained on the relation between peripheral speed, stock concentration, and horse-power consumption. Several methods have been investigated for determining the degree of hydration. Unfortunately progress has been hampered by inability to obtain foreign testing instruments and appliances.

Cross-ties.—The experimental work during the year has been confined to creosote treatment of jack pine and hemlock, which are two of the most important woods for railway cross-ties. Some 16 charges of jack pine and 4 charges of hemlock ties have received experimental treatment under different conditions of temperature, pressure, moisture, vacuum, etc. The sapwood of these species is penetrated by creosote fairly well, but the heartwood is very resistant to impregnation. Not much improvement is noticed by preliminary steaming and vacuum, but proper drying of the ties is important.

Acetone.—Reports and miscellaneous information have been submitted to the Imperial Munitions Board in connection with experimental and investigative work on acetone and substitutes as solvents in cordite manufacture. The new solvents proved successful, but there has not yet been need for using anything but pure acetone. The superintendent, as a representative of the Imperial Munitions Board, has been giving most of his time during the last half of the year to special work on acetone.

Blotting Paper.—A number of runs of blotting paper have been made under conditions found necessary in previous experiments, and a satisfactory grade has been made on the semi-commercial paper machine. Several thousands of these sample blotters have been printed and distributed by the Forestry Branch as forest fire protection notices.

Pulpwood Measurements.—Some further work has been done on the investigation of the feasibility of barking, chipping, drying and baling pulpwood for shipment to chemical pulp-mills. In view of the fact that saw-mills are at present burning slabs which contain raw material for good grades of pulp, data were obtained from saw-mills and a supply of slabs was carefully measured and chipped to determine the yield of chips per cord compared with rough or peeled round wood. The results are discussed in detail in a paper entitled "Pulpwood Measurements and some Factors involved in Chipping and Baling Pulpwood" published in the *Pulp and Paper Magazine,* December 15, 1916. Attention is being given to commercial tests on drying of pulpwood chips.

Potash.—No further experimental work was done, but correspondence and literature study were continued. A report on potash from wood ashes was prepared and copies were sent to interested parties. Recovery of potash is receiving a certain amount of attention commercially in Canada during the present shortage.

Chemistry of Wood.—Very satisfactory progress has been made on this project and this investigation has taken its place as a fundamental study of the chemical properties of Canadian woods, particularly in relation to pulp-making. A new method for the determination of cellulose has been brought out and other methods of wood analysis have been improved. Black spruce, white spruce, red spruce, balsam fir, and poplar have been studied to date.

Paving Blocks.—An experimental investigation of the creosote treatment of red pine paving blocks has been planned for, but there has been no opportunity to carry forward the work. In the meantime the results of tests, specifications, and recommendations regarding treated wood-block paving in the United States and elsewhere are being analyzed, so that the laboratories can properly keep in touch with the Canadian situation.

Fence-posts.—Twenty-two Russian poplar fence-posts from the Forest Nursery station, Indian Head, Saskatchewan, were seasoned and treated with creosote by the open tank process. Determinations of rate of seasoning, moisture content when treated, absorption, and penetration were also made. The treated posts were shipped back to Indian Head for a service test in comparison with untreated posts set in the ground under the same conditions.

Oils for Ore Flotation.—A special investigation of Canadian wood oils for flotation of Cobalt and other ores was actively carried on during the greater part of the year in co-operation with the Mines Branch. By-product creosote and ketone oils now available commercially in the hardwood distillation industry have in some cases given promise of successful substitution for pine oil now imported from the Southern States, and the results are being checked up on a commercial basis at Cobalt. Various oils obtained by small scale distillation of Canadian resinous woods, including red pine and western yellow pine stumps, have also been tested, but the prospects for utilizing this waste material are not so promising. Valuable data have been obtained on the physical and chemical properties of the various wood oils and fractions thereof. The results have been summarized in two papers, "Flotation Experiments with Canadian Wood Oils" and "Canadian Wood Oils for Ore Flotation," by R. E. Gilmore and C. S. Parsons, for publication in the Bulletin of the Canadian Mining Institute.

Durability of Wood.—One hundred and two test pieces, representing 11 wood species, of which 7 were conifers and 4 hardwoods, were exposed in specially prepared fungus beds to determine the relative natural durability in contact with the important wood-destroying fungi. The results have confirmed the fact that conifers are more resistant to decay than hardwoods, but improved methods of test will have to be worked out in this difficult field in order to throw more light on the important subject of wood decay. About 100 test pieces of Douglas fir have also been exposed to various fungi under different conditions, in culture jars, to establish the characteristics of Canada's most important structural timber.

Fibre Measurements.—About 12,000 fibre measurements have been made during the year to establish the variation in fibre dimensions of the wood throughout the tree. The species under examination were Douglas fir, black spruce, white spruce, red pine, and white pine. The results on the first species have been summarized in a paper entitled "Douglas Fir Fibre, with Special Reference to Length," by H. N. Lee and E. M. Smith, published in the *Forestry Quarterly,* December, 1916.

Sulphite Pulp.—A start has been made on the investigation of the sulphite cooking process, which is the most important method of converting pulpwood into valuable chemical pulp. With the small scale apparatus available studies have been

made on the penetration of the cooking liquor into the wood under various conditions, with special reference to the effect of moisture content of the chips. The preliminary results have been published in a paper on "Wood as a Raw Material in Papermaking," by Dr. B. Johnsen, in the *Pulp and Paper Magazine,* April 5, 1917.

PUBLICATIONS.

The following are the publications of the year:—

Forestry Branch Bulletin No. 59, "Canadian Woods for Structural Timbers", by H. N. Lee, copies of which were distributed to persons interested.

"Testing of Pine Oil for Flotation", by J. S. Bates (published in *Monthly Bulletin* of the Canadian Mining Institute, June, 1916).

"The Preservative Treatment of Timber", by W. G. Mitchell (published in *Canada Lumberman,* June 15, 1916).

"The Fibre Structure of Canadian Woods", by H. N. Lee (published in *Canada Lumberman,* July 15, 1916).

"The Staining of Wood Fibres for Permanent Microscopic Mounts", by H. N. Lee (published in *Botanical Gazette,* October, 1916).

"Douglas Fir Fibre; with Special reference to Length", by H. N. Lee and E. M. Smith, published in *Forestry Quarterly,* December, 1916).

"Pulpwood Measurements and some Factors Involved in Chipping and Baling Pulpwood", by O. F. Bryant (read before Technical Section of the Canadian Pulp and Paper Association, November 25, 1916, and published in *Pulp and Paper Magazine of Canada,* December 15, 1916).

"The Pulp and Paper Industry in Canada", by O. F. Bryant (published in *Pulp and Paper Magazine of Canada,* January 4, 1917).

"Wood as a Raw Material in Papermaking", by B. Johnsen (read before Technical Section of Canadian Pulp and Paper Association, January 31, 1917, and published in *Pulp and Paper Magazine* of Canada, April 5, 1917).

During the year a number of unpublished papers have been prepared by members of the staff for presentation before various societies, a list of which is as follows:—

"The Forest Products Laboratories of Canada", by J. A. Coderre (read before Chambre de Commerce, Montreal, April 5, 1916).

"Canada's Work in Forest Research", by W. B. Campbell (read before Canadian Forestry Association, Ottawa, January 15, 1917).

"Dry Rot in Buildings", by W. Kynoch (read before Canadian Lumbermen's Association, Toronto, February 6, 1917).

"Results of Strength Tests on Canadian Black Spruce, White Spruce, White Pine and Red Pine", by R. W. Sterns (read before Canadian Lumbermen's Association, Toronto, February 6, 1917).

"Utilization of the Raw Material from our Canadian Forests", by J. S. Bates (read before St. James Literary Society, Montreal, February 15, 1917).

"Acetone as a War Material and its Relation to the Hardwood Distillation Industry", by J. S. Bates (read before Ottawa Foresters' Club, March 7, 1917).

"Flotation Experiments with Canadian Wood Oils", by C.S. Parsons and R. E. Gilmore (read before Canadian Mining Institute, March 8, 1917).

PUBLICITY AND CO-OPERATION.

During the year several hundred visitors interested in wood-using industries and conservation have come to the laboratories to see the work which is being carried on.

More and more stress is being laid on co-operation with scientific societies, trade associations, and the wood-using industries in general. Co-ordination of the government scientific branches with the various industries of the country is really necessary in order to eliminate a great deal of overlapping and waste effort, to carry out investigations with a thorough understanding of Canadian conditions, and to achieve the practical commercial results which represent the ultimate benefit of such work to the country as a whole. The superintendent has served again as Chairman of the Technical Section of the Canadian Pulp and Paper Association, member of the Committee on Uses of Wood in Building Construction of the National Fire Protection Association, member of the Committee on Publicity of the American Wood Preservers' Association, and member of the Council of the Society of Chemical Industry. Members of the staff have attended meetings and taken an active part in the work of various associations and societies, and have visited industrial plants, etc., in different parts of the country in connection with collecting or furnishing information.

The general Advisory Committee to the laboratories has held three meetings during the year and has given valuable assistance in matters of general policy. Last fall the laboratories secured the active co-operation of the pulp and paper industry by the appointment of a special Advisory Committee to the Division of Pulp and Paper from the Technical Section of the Canadian Pulp and Paper Association.

INFORMATION FURNISHED.

The answering of inquiries regarding woods and their uses has become a more and more important function of the laboratories, as the public have become aware of this governmental source of information. About three hundred such reports were prepared during the year.

The information desired was mainly on the following subjects: strength of various species of wood; suitability of species for particular uses; uses of various kinds of wood waste; identification of wood specimens; technical methods of examination of wood; botany of trees; characteristics of wood fibres; production of tannin, gums and oils from various species; weights of various species; warping and checking of lumber; the moisture content of wood for certain uses; the processes of preservation applicable to various woods for various purposes; the distinctions between rolls of different materials in the beating of paper pulp; method for the determination of fermentable and non-fermentable sugars in waste sulphite liquor; the manufacture of wood flour; the "souring" of pulp when allowed to stand; uses of grasses in paper making; the chipping and baling of pulpwood; tests for pulp and paper; utilization of paper- and pulp-mill by-products; possibilities of hardwoods for mechanical pulp; recovery of pine oil from the sulphate process; durability of railroad ties; fungus attack on mine timbers. Besides these a host of minor inquiries from all parts of the country have been answered.

JOHN S. BATES,

Superintendent, Forest Products Laboratories of Canada.

PART VII

IRRIGATION

REPORT OF THE SUPERINTENDENT

Following the rule adopted last year this report of the Irrigation Branch for the year ended March 31, 1917, comprises brief reports by myself and by the Commissioner of Irrigation and Chief Engineer, under whose supervision much of the work was conducted.

The grain crop in southern Alberta and southwestern Saskatchewan—the district in which the principal interests of the Irrigation Branch are centred—was again good. The yield was, generally, not as high as in 1915, but was distinctly above the average, and in some districts equalled the record of 1915. This, coupled with the higher prices which obtained in 1916, made the crop of that year very profitable and many settlers who had suffered severely from crop failures prior to and during 1914 are now, as the result of two good harvests, on the high road to prosperity.

The exceptionally good grain crops in southern Alberta and southwestern Saskatchewan in the years 1915 and 1916 were due, primarily, to the unusually plentiful and well-distributed rainfall throughout the critical periods of the growing season, coupled with hot, dry weather during the ripening period in August, and to the absence of rust which so seriously affected the crops in other districts. The average precipitation at Calgary during the growing season for the 32-year period 1885-1916 was 13·5 inches, ranging from 6·8 inches in 1892 to 31·5 inches in 1902. The precipitation during this period, April to October, inclusive, during 1915, was 17·3 inches, and during 1916, 10·8 inches. While the latter is below the general average, the heavy rainfall of September and October, 1915, and April and May, 1916, more than compensated for the scanty precipitation during June and July of 1916. In this connection it is well to remember that the volume of rainfall is of less importance than its seasonal occurrence.

While an adequate and well distributed volume of moisture supplied naturally in the form of rain is undoubtedly more satisfactory than a similar amount supplied artificially by irrigation, the rainfall statistics and crop yields throughout this period clearly indicate the value of irrigation as a means of crop insurance, even in cases where it may not be required every year for the production of forage crops.

IRRIGATION DEVELOPMENT.

The practical completion of three of the larger irrigation projects, the discontinuance of work on others owing to the difficulty of securing funds, the falling-off in immigration, the shortage of man power and the high rate of wages for farm help have resulted in temporary stagnation in the development of irrigation enterprises.

The condition of the labour market is seriously interfering with ordinary farm work, and will probably result in a reduced acreage being planted in 1917. The effect upon irrigated farms is even more serious than in districts where irrigation is not practised. The irrigation farmer expects, and should receive, a greater return than his neighbour who practises ordinary farming methods, but in order to accomplish this he must make greater expenditures both of capital and labour. As both capital and labour are at present scarce and dear, the irrigation farmer finds it difficult, and in some cases quite impossible, to complete the construction of irrigation works or to maintain such works after construction, or to prepare his land so as to reap the return he should receive from the application of irrigation water. The result is that the larger completed projects are being settled and developed very slowly, while little

development work is being done on the smaller projects except in cases where the owner is himself able to do the work.

This is particularly regrettable at the present time when large areas of excellent land in the "dry belt" are awaiting the settler and the plough, and where irrigation works which have cost many millions of dollars are lying practically idle because of the falling-off in immigration, while at the same time there is greater need than ever before for increased agricultural production. This unfortunate condition will undoubtedly right itself in time, but meanwhile the land is unproductive and little or no return is being realized on the invested capital, while the maintenance expenses are almost as great as if the systems were being fully operated.

FIELD WORK.

In his report submitted herewith the Commissioner of Irrigation has described in some detail the nature and extent of the administrative and field work done during the past year. The work has been carried on under peculiarly difficult conditions. Many of our most experienced and efficient officers are absent on military duty—fifty-five having enlisted for overseas service and one being assigned to similar duty in Canada—and it is becoming increasingly difficult to keep the work up to its former standard of efficiency.

The necessity for economy has not been overlooked. All field survey work has been temporarily abandoned and a considerable saving has been effected by combining the work of stream measurement with irrigation inspections in certain districts. Although strongly urged to continue certain partially completed surveys—particularly in the district south and east of Lethbridge, Alta.,—with a view to finally determining the location and extent of areas that can be irrigated from the available sources of water supply, it has been decided not to prosecute this work further at present, although it is beyond question that its completion is essential to the fullest development of those districts. It may, however, safely be said that this work has by no means been abandoned; its completion has merely been deferred for a time.

HYDROMETRIC SURVEYS.

The work of hydrometric surveys (stream measurements) has been carried on much as in former years. Most of the gauging stations established in previous years have been maintained, and new ones have been established as opportunity offered. The policy has been to establish permanent stations on the more important streams and to continue measurements at these stations for an indefinite period. On the smaller streams, of less relative importance but still important in a limited sense, measurements will be continued for a period of approximately ten years from the date of the installation of the stations—a ten-year record being assumed to be sufficient for administrative purposes. In still other cases it has been found necessary in connection with local water supply problems to measure the flow of springs and small creeks at frequent intervals and with considerable exactness, but such measurements are rarely continued beyond a year or two, and are abandoned as soon as sufficient information has been obtained to serve the need of the case then being dealt with, which is usually the supply of water for domestic purposes for some village or settler.

The territory covered by this work is divided, for convenience of administration, into twelve districts, each in charge of an engineer, who, with one helper and the necessary gauge observers, performs all the field work. During the open-water season, 177 gauging stations were maintained, and records were also obtained at 138 gauges established on irrigation canals and ditches; during the winter season, 84 stations were maintained.

DRAINAGE.

The ownership and control of all sources of surface-water supply, including lakes, marshes and swamps, in the provinces of Alberta and Saskatchewan, and in that portion of the province of Manitoba added thereto by the Manitoba Boundaries Extension Act, 1912, are vested in the Crown in the right of Canada. (R.S.C. chap. 61.)

The unalienated public land within the boundaries of the provinces of Alberta, Saskatchewan and Manitoba is similarly owned and controlled by the Crown in the right of Canada, while control of the drainage of land is vested in the Crown in the right of the several provinces.

This divided jurisdiction has provoked controversy and has seriously interfered with the reclamation of submerged or swamp land and with the construction of highways, and has materially retarded the settlement and development of districts comprising large areas of such submerged or swamp land.

Efforts have from time to time been made, through informal conferences between representatives of the Dominion and Provincial Governments, to devise some mutually satisfactory and uniform means of dealing with the drainage of Dominion land, and at a conference held in Regina, Sask., in November, 1916, an agreement was reached with respect to:—

1. Small drainage projects to be dealt with by the Dominion Government;
2. Drainage of Dominion land in connection with the construction of highways by the Provincial Governments;
3. Drainage of Dominion land within the boundaries of drainage districts organized under Provincial Drainage Acts; and
4. Drainage projects initiated by the Dominion Government under the provisions of the Provincial Drainage Acts.

The result of this conference was reported by the conferees to their respective governments, with a recommendation that such legislation be enacted as might be required to give effect to the aforesaid agreement.

The Government of the province of Alberta subsequently signified its approval of the proposed methods of dealing with the several classes of drainage projects hereinbefore referred to, in accordance with the procedure agreed upon at the conference, and, as evidence thereof, submitted a draft of a Bill intituled "An Act respecting the Drainage of Dominion Lands," to be submitted for enactment by the legislature then in session, thereby giving effect to the agreement in so far as legislation is required by the province of Alberta.

Upon receipt of this draft Bill the Dominion Government, by an Order in Council dated 17th March, 1917, approved of the agreement and undertook, upon the enactment by the respective provincial legislatures, or any of them, of adequate legislation to give effect thereto, to approve and promulgate such regulations as may be required to carry the agreement into effect.

The Government of the province of Alberta duly passed "The Reclamation Act," and the Dominion regulations are now in course of preparation.

The agreement reached with respect to the several classes of drainage projects previously referred to is as follows:—

Small Drainage Projects.

Application is frequently made to the Dominion Government by owners of, or entrants for, fractional quarter-sections of land, the remaining portions of which are covered by the waters of lakes, or marshes, for permission to drain such bodies of water in order to reclaim the underlying land, which will thereafter be disposed of in one way or another (usually free of cost) to the applicants.

In other cases application is made for permission to drain such bodies of water and to purchase the underlying land.

It is usually found to be in the public interest that such small and shallow bodies of water should be drained, but in spite of the willingness of both the Dominion and Provincial Governments there has heretofore been no means of satisfactorily doing this except by following the procedure of the Private Ditches Acts of the Provinces of Alberta and Saskatchewan, or the Land Drainage Act of Manitoba, all of which provide unnecessarily elaborate machinery which is not well adapted to such small projects, although quite suitable to those somewhat more extensive.

The agreement hereunder provides a simple and satisfactory method of dealing with such projects and adequately provides for the maintenance of the drainage works after construction. Its adoption will be a boon to the settlers and a convenience to all the governments concerned—but chiefly to the Dominion.

(Agreement. Section 1.)

When application is made to the Dominion Government for permission to drain small lakes or swamps in order that the owners of, or entrants for, fractional quarter-sections of land thereby affected may be able to reclaim by drainage the submerged or swampy portions of such land and secure patent for the full area of each such quarter-section, or where application is made to the Dominion Government for permission to drain small lakes or swamps and to purchase the land to be thereby reclaimed, the applicants in such cases shall not be required to comply with the provisions of the Private Ditches Acts of the provinces of Alberta and Saskatchewan or the Manitoba Land Drainage Act, but upon production of evidence satisfactory to the Provincial Minister having control thereof that adequate provision has been made

(*a*) For the disposal of the water of such lakes or swamps;

(*b*) For the protection of roads, highways, and other public works;

(*c*) By agreement among the respective applicants for sharing the cost of constructing the proposed drainage works, and for the subsequent cost of maintenance;

and that the consent of the Dominion Government has been obtained, and upon submission to the said Provincial Minister of the report of the engineer appointed, or to be appointed, by the Minister of the Interior, the said Provincial Minister may approve of plans of the said proposed works, and the applicants shall thereupon become entitled to exercise all necessary powers respecting the expropriation of land required for right of way of the proposed works and for the settlement of the amount of damages with the owners of any lands affected thereby.

Provided, that the area to be reclaimed shall not in any one case exceed 1,280 acres and the estimated cost of the proposed works, as shown by plans thereof prepared by an engineer appointed or approved by the Minister of the Interior, shall not exceed the sum of $2,000;

Provided, further, that any and all ditches or other works so constructed shall thereafter be maintained in the same manner and subject to the same conditions as are prescribed by Section 34 of the Alberta and Saskatchewan Private Ditches Acts, or in the province of Manitoba by Sections 45, 46, and 47 of the Manitoba Land Drainage Act, as if the said works had been constructed in accordance with the provisions of the said Acts.

Drainage in connection with Road Construction.

Considerable difficulty has been experienced by the Provincial Governments in constructing roads through the central and northern portions of the Prairie Provinces

and wide detours are often necessary to avoid shallow lakes or swamps. It has frequently been found that roads built at considerable expense are impassable for long periods and that the only practicable means of building good and durable roads is by first undertaking to drain bodies of water or vacant swamp land owned or controlled by the Dominion Government.

The Provincial Governments have not been willing to spend their limited revenues for works which would largely benefit vacant Dominion land, without receiving some financial assistance from the Dominion Government. The agreement provides for the sale to the provinces of a sufficient area of the land to be reclaimed by such works to pay for the cost of the drainage and road work, and further provides that the provinces shall sell the land so acquired at public auction, subject to settlement and to such further conditions as the Dominion Government may impose, and for the refund to the Dominion of any portion of the sale price after the cost of the works has been defrayed. .

(Agreement. Section 2.)

When the Lieutenant Governor in Council deems it necessary in the public interest that any submerged or swampy Dominion land should be reclaimed by drainage in order to facilitate the construction or improvement of public highways through the district in which the said land is situated, and upon the consent of the Dominion Government having been obtained for the drainage of any bodies of water within the purview of the Irrigation Act, and for the construction of the proposed works on the said Dominion land, the Lieutenant Governor in Council may purchase from the Dominion Government any portion of the Dominion land to be so reclaimed. Any land so purchased shall be offered for sale by the Lieutenant Governor in Council at public auction, in accordance with such conditions as may be imposed by the Dominion Government, and the proceeds of the sale of the land shall be applied towards the cost of the said drainage and road work. Any surplus money remaining after the total cost of the work, including the purchase price of the land, shall have been repaid, shall be refunded to the Dominion Government;

Provided, that the expenses of the sale of the land and of the collection of the purchase price shall be considered as part of the cost of the said works;

And provided, further, that adequate provision shall be made by the province for the maintenance of the said works after construction.

The following action shall be taken by the province to give effect to the foregoing:—

1. An inspection and survey of the land; the laying out of the drainage ditches; the preparation of plans, with an estimate of cost and the proportionate benefit to each parcel of land affected, and the submission of such plans and estimate to the Dominion Government, with

2. An application to the Dominion Government to transfer to the province as much of the land affected by the works as may be necessary to fully cover the cost of the works.

Dominion Land within Organized Drainage Districts.

In many of the more northerly portions of the Prairie Provinces the arable land consists of ridges or islands interspersed with shallow lakes or swamps. Settlement is sparse because of the limited area of arable land and the difficulty of access to it at certain seasons.

The few resident owners are unable to drain their own lands because usually a comprehensive scheme of drainage is required, the cost of which is beyond their means. The bulk of the land in such districts, or certainly a goodly proportion of it, is vacant

Dominion land not assessable for any portion of the cost of the drainage works, although benefiting by such works equally with the land of resident owners.

(*Agreement. Section 3.*)

Where vacant Dominion land is included in a proposed drainage district and the province applies to the Dominion Government for the sale of such land to the province, and the Dominion Government agrees to sell the land, the Provincial Government shall be deemed to be qualified as a "resident owner" under the respective Provincial Drainage Acts.

The procedure required to give effect to the foregoing was agreed upon as follows:—

1. The province shall have an investigation made, in accordance with the provincial laws respecting drainage, and shall have a report and plans prepared, together with an estimate of the cost of the proposed works, the area and character of the land affected thereby, and the proportion of the cost to be assessed upon each parcel of land affected.

2. Such reports, plans, estimates of cost, and proportionate assessment shall be forwarded to the Minister of the Interior, together with a separate schedule of the Dominion land affected by the proposed works and the proportion of the cost of the works to be assessed upon each parcel thereof, with a request that the said land, or such portion thereof as may be available, be sold to the province in order to facilitate the organization of the drainage district and the undertaking of the necessary work.

3. If the plans of the proposed works and the estimated cost thereof are approved, the Minister of the Interior shall secure the approval of Council for the sale to the province of the available Dominion land affected by the proposed works, in accordance with the provisions of an agreement to be prepared under his direction and attached to the Order in Council. Such agreement shall contain, among other provisions, the following:—

(*a*) The land shall be sold at the rate of $1 per acre (or as may be agreed upon), payable as follows: Ten per cent of the purchase price shall be paid within thirty days of the execution of the agreement and the balance in nine equal, annual instalments, with interest at five per cent per annum upon the unpaid principal. Title to the said land shall remain in the Crown, in the right of Canada, until paid for in full, and title may then issue either to the province, or to its nominees, as may be requested by the provincial authorities. In the event of the province desiring to complete the purchase and take title to any part of the land sold before payment in full has been made for the whole tract, payment in full shall be made for such parcel or parcels, before letters patent are issued.

(*b*) The land so sold to the province shall be offered for sale at public auction within a period of two years from the date of the completion of the works, or within such extended period as may be authorized by the Minister of the Interior for that purpose. The sale shall be made under regulations similar to those prescribed by the Minister of the Interior for the sale of School Lands, and the minister may be represented at such sales, if he so desires. It shall be a condition of all such sales that the purchaser shall build a habitable house upon the land purchased and shall go into residence thereon, or within nine miles of such land (or words to that effect to harmonize with Sub-section 2 of Section 28 of the Dominion Lands Act) within a specified period and shall reside continuously upon the land for a period of not less than six months in each of three successive years.

4. The organization of the drainage district shall then be completed in accordance with the provincial laws. In the event of failure to organize a

drainage district through the unwillingness of the resident owners, or for any other cause, the agreement for sale shall not be executed and the application submitted by the province for the purchase of the land shall be cancelled.

5. Any land which at the time of the organization of the drainage district is held under entry, but is un-patented, and which is subsequently abandoned by the entrant, shall not be liable for any portion of the cost of the works remaining unpaid at the date of the said abandonment. Such land shall, however, upon abandonment, be sold to the province at the same rate and subject to the same conditions as the land set out above, reserving to the entrant the right to his improvements; provided that if such land is subsequently sold by the province credit shall be given the purchaser for the amount of any drainage assessments paid by the previous owner or entrant and subject to any such assessments remaining unpaid at the date of the sale.

6. The proceeds of the sale by the province of land so acquired from the Dominion Government shall be applied by the province:—

(*a*) To recoup to the province any and all expenditures made in connection with the organization of the drainage district and the construction of the drainage works therein or in connection therewith, including the purchase price of the land, other than the proportionate cost assessed upon privately-owned land and remaining unpaid at that date;

(*b*) To cancel and remit the unpaid assessments charged against the aforesaid privately-owned land in the drainage district.

(*c*) To refund to the owners thereof any portion, or all, of the assessments previously paid on the said privately-owned land in the drainage district; and

(*d*) Any surplus remaining shall be applied towards the construction of roads and bridges in the rural municipality, or municipalities, in which the said drainage district is situated.

7. An account shall be kept by the Provincial Government of the proceeds of all sales of Dominion land acquired in connection with any drainage district, and of the disposition thereof, and a detailed statement thereof and of the expense incurred by the province in connection with each such district shall be rendered to the Dominion Government annually.

Drainage Projects Initiated by the Dominion Government under the provisions of Provincial Drainage Laws.

In certain cases where it is found to be in the public interest to drain shallow lakes or marshes, and where the adjacent lands have been alienated and are, for the most part, arable, the direct benefits of drainage accrue almost entirely to the submerged land which is owned by the Dominion. The settlers in the surrounding districts benefit only indirectly by the improved roads and more convenient routes of travel.

Under present conditions the Dominion Government cannot undertake the improvement of its own land without encountering serious legal difficulties, particularly in the expropriation of right of way for ditches, etc., and in making adequate provision for the maintenance of the works after construction.

Under the agreement the Dominion Government will be deemed a "resident owner" and will have the right to construct works for the reclamation of such land and to exercise all needful powers under the provisions of the Provincial Drainage Acts. In any case where such work is undertaken by the Dominion Government it is intended that the reclaimed land shall be sold at public auction and subject to settlement duties and that the proceeds of the sale shall be used to recoup to the Dominion Treasury the entire cost of the work. Dominion legislation may possibly be required before any such work is undertaken; certainly the money for the work must first be voted by Parliament, but the agreement removes any obstacles in so far as the Provincial Governments are concerned.

(Agreement. Section 4.)

When the Dominion Government, as the owner of vacant Dominion land requiring drainage, desires to reclaim such land in accordance with the provisions of the Provincial Drainage Laws, the Dominion Government shall be deemed to be qualified as a "resident owner" under the provisions of the respective Provincial Drainage Acts.

The provisions of the respective Provincial Drainage Acts shall be complied with by the Dominion Government in so far as the same may be applicable thereto; provided that:—

1. The inspection and survey to determine the feasibility of the proposed project, and the proportionate cost of construction works to be assessed upon each parcel of land affected thereby shall be made by an engineer appointed or assigned thereto by the Minister of the Interior, but the report of such engineer shall after having been approved by the Minister of the Interior, be dealt with in accordance with the provincial laws.

2. The whole cost of construction of such works shall be borne by the Dominion Government, and no debentures will be required in connection with any such drainage district. The proportion of the cost of the works assessed upon any land other than Dominion land comprised in any drainage district shall be collected annually, in the manner provided in the respective Provincial Drainage Acts, and deposited with the Provincial Treasurer, who shall, upon receipt thereof, promptly remit the amount so collected to the Minister of the Interior, to be applied in reduction of the expenditure made by him for the construction of the works. The Dominion land shall be offered for sale at public auction within a reasonable time after the completion of the drainage works, and the said land shall be sold subject, among other things, to settlement conditions, and upon the further condition that the purchasers of the said land shall be responsible for the maintenance of the drainage works in accordance with the provisions of the provincial laws and in accordance with the proportion of cost fixed by the engineer at the time of the organization of the district.

While as previously stated, the Government of the province of Alberta has enacted legislation to carry this agreement into full effect, the Saskatchewan Government has only partially done so by an amendment to the "Highways Act," passed at the last session of the legislature. This legislation deals only with such drainage of Dominion land as may be found necessary in connection with the construction or maintenance of highways. It is to be hoped that the further legislation required to give full effect to the agreement will be enacted at the next session. No action has been taken by the Manitoba Government to confirm, or otherwise, the agreement reached by the conferees.

Two small reclamation projects have been authorized in the province of Alberta under the provisions of this agreement.

1. Mr. John Hedberg has been permitted to purchase at one dollar per acre the NW. $\frac{1}{4}$ of section 6, township 54, range 16, and the NE. $\frac{1}{4}$ of section 1, township 54, range 17, west of the 5th meridian, for reclamation by drainage, comprising an area of some 317 acres.

About 75 per cent of this land is composed of muskeg covered with small brush and under water. In its present condition it is valueless but when reclaimed and cleared will be valuable as hay and agricultural land. The land can be effectively drained into Edson creek, which will provide a sufficient outlet.

2. Mr. N. J. Bailey has been permitted to purchase at one dollar per acre an area of some 798 acres for reclamation by drainage in township 53, range 3, west of the 5th meridian, portions of which are covered by the waters of a shallow muskeg lake.

The lands at present are worthless but when reclaimed will be valuable for agricultural purposes and can be drained into the North Saskatchewan river through an intermediate creek system.

Preliminary surveys will be made during the season of 1917 to determine the feasibility and probable cost of a large reclamation project. This project comprises a large but useless lake and several smaller lakes and marshes, all situated within a well-settled mixed-farming district and within convenient distance of good market towns and railways. These bodies of water apparently serve no useful purpose, except as a resort for wild fowl, and constitute a serious obstacle to the further development of an otherwise prosperous farming district.

PERSONNEL.

The "Honour Roll" of the Irrigation Branch now contains the names of fifty-six officials who have enlisted for active service. Charles P. Maxted died of wounds; Nelson R. English, who had previously been reported wounded and missing, was, on 16th April, 1917, officially reported as having died on or since 15th September, 1916; several have been wounded, some seriously; Lieut. W. T. White was awarded the Military Cross, and several others have won promotion for service in the field.

The honour roll is now closed; the names of any who may hereafter enlist under any other than the voluntary system must be recorded separately. It is believed, however, that but few of the remaining officials of this branch are eligible for military service.

REVENUE.

Appended hereto is a statement of the revenue received and accounted for during the year ended 31st March, 1917.

Lethbridge agency	$ 59 65
Calgary Agency	1,356 35
Medicine Hat	6,158 25
Swift Current	1,199 40
Maple Creek	3,753 26
Irrigation Branch, Calgary	957 13
" " Ottawa	1,897 18
	$15,381 22

which is made up as follows:—

Land sales	$14,310 51	
Reservoir leases	81 58	
License fees	576 00	
Registration fees	19 00	
Preparation of plans	394 13	
		$15,381 22

E. F. DRAKE,
Superintendent of Irrigation.

ROLL OF HONOUR.

Irrigation Branch—Department of the Interior.

Employees Enlisted for Active Service.

J. W. H. Wilkes	Leveller	Aug, 16, 1914	Lieut. 3rd Brig., R. H. A.
E. S. McMillan	Draughtsman	Aug. 21, 1914	L. Corp. Div'l Engineers.
W. E. Dow	Draughtsman	Aug. 22, 1914	Bombing Instructor, 13th M. D., Calgary.
C. V. Craik	Asst. Engineer	Aug. 22, 1914	Corp. Div'l Engineers.
E. S. Clifford	Hydro. Asst	Aug. 24, 1914	Maj. Asst. Provost Marshal.
R. V. Muller	Leveller	Aug. 26, 1914	Tpr. Royal Can. Dragoons.
C. E. Vrooman	Leveller	Sept. 26, 1914	Spr. Div'l Engineers.
C. P. Maxted (died of wounds).	Rodman	Sept. 26, 1914	Spr. Div'l Engineers.
H. E. Bowden	Teamster	Sept. 26, 1914	Spr. Div'l Engineers.
J. S. Ferrier	Draughtsman	Nov. 6, 1914	Lieut. Machine Gun Corps.
H. D. St. A. Smith	Asst. Engineer	Nov. 9, 1914	Maj. Div'l Engineers.
C. B. Hornby	Accountant	Nov. 16, 1914	Capt. & Adjt., 31st Battalion.
G. N. Page	Leveller	Nov. 16, 1914	Pte. Army Service Corps.
D. C. McDougall	Accountant	Nov. 19, 1914	Q. M. S. Div'l Engineers.
G. H. Nettleton	Hydro. Asst	Jan. 4, 1915	Lieut. Provost Marshal's Staff.
N. J. Arnold	Draughtsman	Jan. 28, 1915	Staff Sergt., 175th Bn., C.E.F.
H. S. Kerby	Asst. Engineer	Feb. 11, 1915	Lieut. R. N. Flying Corps.
J. H. Jones	Asst. Engineer	Apr. 26, 1915	Capt. Div'l Engineers.
E. W. W. Hughes	Asst. Engineer	May 8, 1915	Pte. 53rd Battalion.
G. R. Elliott	Asst. Engineer	Aug. 16, 1915	Lieut. Signallers, Can. Engrs.
W. T. White (Awarded Military Cross).	Asst. Engineer	Aug. 16, 1915	Capt. 1st Pioneer Battalion.
H. W. Cheney	Asst. Engineer	Sept. 29, 1915	Lieut. 4th University Co.
N. R. English (died of wounds).	Rodman	Sept. .., 1915	Pte. 4th University Co., P. P. C. L. I.
W. E. Hunter	Accountant	Oct. 2, 1915	Sergt.-Maj., 87th Battalion.
E. L. Hornby	Draughtsman	Oct. 12, 1915	Pte. No. 3 Co., 12th Platoon, 16th Bn., Can. Scottish.
J. Cawthorn	Clerk	Oct. 14, 1915	Co. Q.M.S., 1st Pioneer Bn.
H. B. R. Thompson	Asst. Engineer	Nov., 8, 1915	Pte. 1st Pioneer Battalion.
F. R. Burfield	Asst. Engineer	Dec. 31, 1915	2nd Lieut. Royal Engineers.
W. G. Guthrie	Draughtsman	Feb. 20, 1916	Pte. Army Medical Corps.
L. E. M. Shenton	Draughtsman	Feb. 24, 1916	Sergt. Australian Imp. Forces.
W. B. Hutcheson	Asst. Engineer	Mar. 13, 1916	Lieut. Royal Flying Corps.
H. R. Carscallen	Asst. Engineer	Mar. 31, 1916	Lieut. Div'l Engineers.
W. R. McCaffrey	Asst. Engineer	Mar. 31, 1916	Sergt. Canadian Reserve Cyclists.
R. E. Matheson	Hydro. Asst	Mar. 31, 1916	Spr. Div'l Engineers.
P. J. Jennings	Office Engr	Apr. 1, 1916	Capt. & Adjt., 4th Pioneer Bn.
G. H. Whyte	Div'l Hdro. Engr.	Apr. 4, 1916	Lieut. Div'l Engineers.
T. H. Burt	Hydro. Asst	Apr. 4, 1916	Pte. Army Medical Corps.
R. H. Goodchild	Asst. Engineer	Apr. 22, 1916	Lieut. 4th Pioneer Battalion.
L. J. Gleeson	Asst. Engineer	May 9, 1916	Corp. 50th Queen's Battery.
F. K. Beach	Asst. Engineer	May 21, 1916	Lieut. 8th Can. Ry. Construction Battalion.
J. M. Paul	Asst. Engineer	May 22, 1916	Gunr. 72nd Queen's Battery.
O. H. Hoover	Asst. Engineer	June 15, 1916	Gunr. 67th O. S. Battery.
I. R. Strome	Asst. Engineer	June 20, 1916	Lieut. 25th Reserve Battalion.
J. A. Currie	Draughtsman	Aug. 1, 1916	Gunr. 73rd Field Battery.
G. C. McIntosh	Draughtsman	Aug. 19, 1916	Pte. Div'l Cyclists.
A. C. Wimberley	Clerk & draughtsman	Sept. 1, 1916	Pte. Depot Ammunition Col., C.F.A., 72nd Battery.
R. J. Srigley	Hydro. Asst	Oct. 1, 1916	Pte. 187th Battalion.
R. J. McGuinness	Asst. Engineer	Nov. 15, 1916	Pte. 239th Battalion.
A. E. Hughes	Packer	Nov. .., 1916	Pte. 211th Battalion.
R. J. G. White	Chief Clerk	Dec. 1, 1916	Spr. Div'l Engineers.
V. Meek	Asst. Engineer	Dec. 11, 1916	Lieut. Tunnelling Co.
T. M. Montague	Asst. Engineer	Dec. 11, 1916	Lieut. Tunnelling Co.
J. A. Telfer	Leveller	Jan. 1, 1917	Pte. Div'l Engineers.
J. E. Caughey	Asst. Engineer	Mar. 1, 1917	Lieut. 78th Battery, C. F. A.
J. E. Switzer	Asst. Engineer	Mar. 12, 1917	Pte. 38th Siege Battery, Can. Garrison Artillery.
R. H. Waterhouse	Clerk	May 12, 1917	Pte. Can. Army Medical Corps.

SUMMARY REPORT ON IRRIGATION AND CANADIAN IRRIGATION SURVEYS.

Organization of Staff.

The organization of the staff was similar to last year, except that the proportion of the staff employed in the office was somewhat greater. This was caused by the fact that all field work was cut down to the necessary administrative work, and no large survey work was undertaken except that necessary to finally complete all field information concerning the Lethbridge Northern project. At the same time, owing to the necessity of completing estimates of certain large projects previously developed in the field, the office engineering staff had to be somewhat increased.

A change in the office procedure was made with a view to placing the assistant chief engineer in a position entailing more direct supervision over all matters of a technical engineering character. This meant that, in addition to the work in connection with the large irrigation companies, all work passing through the office engineer's hands and all the office work in compiling the reports on the surveys of the large irrigation projects was directly supervised by him.

It was again necessary to make a considerable number of changes in the personnel of the staff owing to men going on active service, yet, on account of the loyal support of the men remaining, it has been possible to carry on the work very efficiently and economically. The total number of persons employed on the permanent office staff was thirty and on the permanent field staff twenty-nine. This gives a grand total of permanent officers of fifty-nine, and including the summer assistants one hundred and four. Owing to the fact that we now have hydrometric records over a fairly long period and that the major portion of the irrigation construction work has been completed, it is planned next year to increase the efficiency and economy of the work in a number of districts by combining irrigation and hydrometric work. Under this new programme the efforts of the inspecting engineers will be, as fully as possible, concentrated on the development of actual field preparation and irrigation.

OFFICE WORK.

The office work carried out is indicated by the schedule below, which is given in a similar form to previous years for purposes of comparison:—

Letters received	13,032
" sent	18,035
Applications for water rights recorded	52
Plans examined and approved	176
Plans amended	145
Agreements, right of way, etc., recorded	45
Right of way plans recorded in quadruplicate	20
Water agreements field in quadruplicate	616
" " cancelled	619
" " transferred	148
Notices for publication prepared	34
Plans prepared	598
Blue prints made	13,950
Certificates issued under section 20	53
" " " 33	47
Licenses recorded, in triplicate	64
Weekly reports received from engineers	2,003
Reports of discharge measurements received	3,137
" gauge heights received	7,855
Descriptions of regular gauging stations, H.I	55
Reports of changes at river stations, H. 22	310

STREAM ADMINISTRATION.

During the year a good deal of correspondence developed in connection with transferring the stream administration and records to the new system to be adopted, and one office engineer was employed entirely on this work. Owing to the fact that it was impossible to make available for this very important work more than one engineer, and that a great many details had to be studied out and the details of the new system worked out, the progress of the work was not entirely satisfactory. However, a very considerable amount of necessary preparatory work was done, as scheduled hereunder, and it is expected that during the coming year the major portion of all the records will be transferred. Drainage basin administration maps have been prepared covering the first thirty-two townships from the British Columbia boundary to the 5th meridian and twenty-four townships from the 5th meridian to the east boundary of the province of Saskatchewan. Schedules of applications and licenses have been prepared for thirteen basins, detail sheets for seven and balance sheets for five. Hydrographs and duration of flow curves have been prepared for fourteen stations.

HYDROMETRIC SURVEYS.

The records of this very important branch of the work are published in a separate report on Hydrometric Surveys. The organization of the work was similar to previous seasons. As noted under the caption " Organization of Staff ", it is expected next year to combine certain of this work with irrigation inspections in order to gain further economy and efficiency. The office staff, including the chief hydrometric engineer, comprised seven men all told. The territory covered was divided into twelve districts and twelve hydrometric engineers were employed in the field. During the open-water season records were taken at 177 regular gauging stations on streams in Alberta and Saskatchewan and at 161 regular gauging stations on irrigation canals and ditches. Winter records extending as far north as the Peace river were secured at 84 regular gauging stations covering practically all the important streams in the two provinces.

CURRENT-METER RATING STATION AT CALGARY.

The rating station was operated as usual and a total of 69 meters rated as below:—

Irrigation Branch	45
British Columbia Hydrometric Survey	10
Manitoba Hydrometric Survey	9
Canadian Pacific Railway Company, Department of Natural Resources	3
Shawinigan Water and Power Company	2
	69

FIELD WORK.

The field work is indicated below, subdivided under the headings of the field parties which carried out the work.

Cypress Hills District—Irrigation Inspection.—In view of the fact that the bulk of the construction work has been completed in this district by 1915, it was no longer considered necessary to provide so fully for the inspection of the irrigation schemes. The old eastern and western districts were, therefore, combined and the whole territory was covered by one party under the charge of Mr. M. H. French. The party took the field on April 29, and disbanded on September 27. Mr. French and his assistant working alone completed all the necessary inspections by November 13. The season comprised 174 actual working days. The total number of inspections made was 184, the number of schemes surveyed was eight, and in addition to this, right of way surveys were made for twelve schemes. The number of miles travelled by team was 2,989. The party consisted of five men with seven horses.

The construction work, tending to carry the unlicensed schemes further towards completion, and for the repairing of damaged structures, was practically nil this year. This is accounted for by the high price and scarcity of labour, owing to the agricultural districts being depleted of able-bodied men who have enlisted in the army. The farm help now available is decidedly unskilled and far from satisfactory, yet demands big wages, being aware that the irrigator has no option. Consequently, the latter must choose between paying big wages to incompetent and unreliable help, or leave the work undone. Generally speaking, the latter course is followed with the plea of no help available.

Calgary District—Irrigation Inspections.—The work was confined to the same district as in the previous year, but the difficulty of transportation, owing to the very heavy roads due to the wet season, again hampered the work considerably. The work was carried out by Mr. J. C. Milligan, who had one assistant and one team of horses. The work was commenced on April 19, and ended on October 26. The season comprised 140 actual working days. The total number of schemes inspected was 137, the number of schemes surveyed was three. The number of miles travelled by team was 1,883, and by train 630.

Practically no construction work was attempted this year and only one scheme was recommended for license. The reason for this has been the great scarcity of labour occasioned by the war and the very wet weather. Financial matters have improved among the ranchers and farmers, owing to the prevailing high prices of their products, and if the labour conditions were normal, construction work could all be completed. Five schemes have been authorized but as yet no work has been done on them. Eight schemes have been authorized but only partially completed.

Special Inspections—Domestic, Municipal, Irrigation and Industrial.—This work was carried on under the immediate supervision of Mr. W. E. G. Hall, office engineer. The routine work as office engineer again consisted mainly of examining and checking all plans prepared by the inspecting engineers or submitted by applicants for water rights or other purposes. In addition to this the office engineer supervised the work of the two special inspectors, and saw that for each trip the inspections were properly grouped, as regards economy in time, travel, expense and the urgency of an early report.

Mr. C. Chambers carried out the inspections in Alberta, totalling 66 in number, and made seven surveys of all descriptions. He travelled 6,254 miles by train and 1,586 miles by team or other means.

Mr. E. L. Miles carried out the inspections in Saskatchewan, totalling 91 in number, and made 19 surveys of all descriptions. He travelled 7,965 miles by train and 2,326 miles by team or other means.

The office engineer examined and checked 321 plans of all descriptions and 55 descriptions for right of way.

Large Irrigation Companies—Progress Reports.

Mr. S. G. Porter, Assistant Chief Engineer, devoted his time to supervising all the large irrigation companies, and the compilation of the final reports upon the projected irrigation developments surveyed during the preceding two years and completed during this year. In addition, he had under his special charge the approval of the classification of irrigable land in the Eastern Section of the Canadian Pacific Railway Company's irrigation block.

The Southern Alberta Land Company completed the re-construction of the main diversion dam, damaged by floods in 1915, from the north end of the dam across and beyond the damaged portion where a temporary connection was made to the south end of the old dam.

It is proposed at some later date to extend the new part the balance of the distance to join the sluice gate structure on the south bank of the river. Aside from the repair work on the dam, no construction work was undertaken during the year.

No field work in connection with the Western Section of the Canadian Pacific Railway Company's irrigation block was carried on during the year. Mr. G. N. Houston, Chief Field Engineer, completed his final report on the re-classification of the irrigable lands and left the service of the department in September, 1916. A considerable amount of office work in connection with the checking and filing of water agreements, and the issuing of classification certificates has been carried out during the whole of the year.

The Alberta Railway and Irrigation Company's system was operated as usual, and a small amount of improvement work and re-construction has been in progress during the year.

Classification of Irrigable Land.—Canadian Pacific Railway Eastern Section.—One field party, consisting of eight men, all told, with seven horses, was put in the field under Mr. J. S. Tempest, who had as his assistant Mr. P. A. Fetterly. The party commenced this work on April 27, and continued until October 28. The same general methods of inspection were adopted as had been established in previous years on this work, but on account of the greater difficulties that were encountered with respect to the alkalinity of the soil, and the extremely flat nature of some localities, the party was increased in size. As a rule the party was divided into two sections, one section devoted almost all its time to soil investigations, and the other to topographical and general inspection. An irrigable area of approximately 92,000 acres was inspected and this completes the field work in connection with the classification of the irrigable land on this project.

Irrigation Surveys.—As noted under the heading "Organization of Staff," very little field survey work was done, but a considerable staff was engaged in completing the office work in connection with several large projects which had been previously surveyed.

One large survey party under the charge of Mr. T. M. Montague was operated during the season, working respectively, on the Lethbridge Northern irrigation project, the Taber irrigation district, and the Macleod irrigation project. The party took the field on April 25, and disbanded on September 13, completing a season of 123 actual working days. A summary of the season's work is as follows:—

161 miles of level lines.
61 miles of traverse line complete with topography;
Topographical features map over 25,000 acres of land;
39 test holes or test pits were made to determine the material for canal excavation; and
20 groups of soil samples were taken.

The Lethbridge Northern Irrigation Project.—The investigation of the feasibility of irrigating certain lands north of the Oldman river from a point north of Macleod to the mouth of the Little Bow river, has been a live issue since 1910. Many schemes have been proposed, the most feasible one of which began to take shape in 1913 as a result of the surveys carried out by this branch during that season. The surveys were continued in 1914 and 1915, and full reports of the investigations leading to the choice of route for the main canal, and an approximate determination of the areas which could be irrigated from it, are contained in the report on irrigation for those years. Prior to 1916 the estimates of cost and area included the lands in the neighbourhood of Carmangay, Barons, and Rocky Coulee. The settlers in these districts, in March, 1916, held a meeting at Barons, and adopted a resolution opposing the inclusion of their lands in the proposed irrigation district. Inasmuch, however, as the settlers in the balance of the district were anxious to have their lands irrigated, it was decided to

complete the surveys and estimates of the project, excluding the land in the east and north, the owners of which were opposed to it. Fortunately, the construction of the system as modified appears to be just as feasible as under the plans originally proposed. The field work completed during the season comprised the re-location of a portion of the main supply canal, the plane-tabling of 16,000 acres of land, the taking of a large number of additional soil samples, and the making of test borings along the route of the main canal to determine the material to be excavated. The office work completed under the charge of Mr. C. M. Arnold comprised the completion of a final report upon the feasibility and cost of this project.

Milk and St. Mary Rivers—Irrigation Project.

During the year 1914, preliminary surveys of this project were carried out by this branch and reports showing the methods of carrying on the field work, together with some approximate estimates of available water supply and cost data, were published for that year. During the year 1916 this branch again placed parties in the field to make more detail surveys, particularly of those tracts of land which from the previous year's surveys it was determined could be the most economically served. During 1916 the necessary office work based on the field surveys already made, was continued by Mr. B. Russell. There has been projected, in as much detail as the information available would permit, a complete system of canals to serve the various tracts described, and complete estimates of the cost of construction have been submitted.

Taber Irrigation District.—In 1915 the province of Alberta enacted the Irrigation District Act providing for the formation of districts whereby the settlers may raise money by the sale of bonds secured by their lands for the purpose of constructing irrigation works.

The same year the farmers between Chin Coulee and Taber, along the Crowsnest Branch of the Canadian Pacific Railway, erected the Taber irrigation district for the purpose of entering into an agreement with the Alberta Railway and Irrigation Company, for the supply of water for the district from a reservoir already constructed in Chin Coulee. The surveys were made by the Canadian Pacific Railway Company, and during the fall of 1915 a complete inspection and classification of the lands were made by this branch.

It was found, however, that a large area in the west end of the district had not yet passed to the ownership of the settlers, who had undertaken to purchase it from the School Lands Branch. It could not, therefore, be bonded under the Irrigation District Act without the consent of the Dominion Government. Efforts were made to secure legislation which would overcome the difficulties, but no solution was found which was satisfactory.

It was then proposed to extend the limits of the district eastward to include an additional area sufficient to bring the total irrigable area in the extended district, exclusive of the School Lands, up to the amount of 17,000 acres, for which a water supply was available. This branch undertook to make the additional surveys which were necessary for this purpose. The field work was carried on from July 26 to August 10, during which time the survey of the main carrying canal was extended to the easterly limit of the tract, and an area containing 9,500 acres of land was plane-tabled. This work developed all the information that was necessary to allow the district to extend its boundaries in order to bring the total irrigable area, exclusive of the School Lands, up to 17,000 acres.

Macleod Irrigation Project.—In 1915 the President of the Board of Trade at Lethbridge made inquiries of this department as to the feasibility of irrigating a strip of land east of Macleod, lying between the Belly and Oldman rivers, in the vicinity of Pearce and Orton. This inquiry was afterwards supplemented by a petition signed

by a number of the owners of land in the district, asking the Government to make surveys to determine whether or not their lands could be irrigated at a reasonable cost. The water required to irrigate this land would be diverted from the Oldman river. The proposed dam, headworks and a portion of the main canal of the Lethbridge Northern project would be utilized, the new district bearing a pro rata portion of the cost of these works. The first definite step towards the investigation of the feasibility of the project was a reconnaissance of the district by the Commissioner and Mr. B. Russell.

During 1916, Mr. Montague with the party under his charge, carried on surveys of this project from April 25 to June 1. During this time the whole area which might be served was blocked out by level lines, and the main supply canals were located. The field investigations carried on developed the fact that, owing to peculiar topographical features, the irrigable area was very much smaller than that estimated by the preliminary reconnaissance. The field surveys indicate that there are only about 9,500 acres of irrigable land in the district, and the estimated cost of supplying them with water is about $24 per acre.

Duty of Water Experiments and Demonstration.—This work was carried on in a similar manner to the previous year, under the supervision of Mr. W. H. Snelson.

Mr. J. E. Degnan had charge of the work in the Coaldale district of the Alberta Railway and Irrigation Company's project at Lethbridge, and his work was devoted to measuring the actual quantities of water applied to the irrigated fields in this district, gaining all information possible with a view to demonstrating what is the proper and most beneficial duty of water.

Mr. H. C. Giffen had charge of the experimental work at the Strathmore plots. It has been very definitely determined that over a considerable area at the Strathmore plots, the ground water level rises to such a height that it is tapped by the roots of the plants, and this makes it impossible to accurately determine the quantity of water used by the plants, and thus renders the plots unsuited for experimental purposes. It is the intention to transform these plots into a demonstration station during 1917, and to establish new duty of water plots at Brooks, Alberta, in the Eastern Section of the Canadian Pacific Railway Company's irrigation project.

Through the courtesy and co-operation of the Southern Alberta Land Company, it was again possible to compile very useful data covering the duty of water on their irrigated demonstration farm at Ronalane, about 40 miles due west of Medicine Hat.

F. H. PETERS,
Commissioner of Irrigation and Chief Engineer.

PART VIII.

WATER POWER.

No. 1.

REPORT OF THE SUPERINTENDENT OF WATER POWER

J. B. CHALLIES, C.E. (Tor.), M. Can. Soc. C.E.

The following report, with the attached reports of Mr. J. T. Johnston, B.A.Sc., C.E., Chief Hydraulic Engineer, and of the officers and engineers in charge of divisions, concerns the activities of the Dominion Water Power Branch for the fiscal year ending March 31, 1917,—

It has been exceedingly difficult during the past fiscal year to maintain those phases of our office and field work which, under all the circumstances were considered to be absolutely necessary. Every possible reduction of expenditure consistent with the absolute necessity of the departmental work, has been effected. The progress which has been made and results achieved are quite satisfactory, and due very largely to the self-sacrificing work of all the members of the staff.

In my preceding report, particular attention was called to the necessity for advertising Canada's water-powers. As the war progresses the growing dependence of industry on water-power, and the ever increasing use of hydro-electric energy, is forcibly exhibited. The per capita consumption of power in Canada for all purposes except railways, is higher than in any other country, and with the increasing use of small accessories, the development of electric cooking and heating, the per capita consumption will be very largely increased. At the same time the industrial use of power is developing at a tremendous rate. It is safe to predict that within a very few years the use of electric energy will be twice what it is to-day. Under a proper scheme of development some day most of our great manufacturing industries and railway terminals at any rate, will be run by water-power.

While the development of hydro-electric power has reached a very high state of efficiency and very little improvement can be hoped for in the art, the efforts of engineers and designers must be devoted to the reduction of costs, largely by improved financing of power enterprises. The Government authorities can directly assist in the reduction of power costs by proper control of construction work, as well as by proper control of rates and services, also by preventing duplication of transmission lines and distributing systems. More especially can the Government authorities assist power development by preventing the usual initial large capital charges in connection with power enterprises that are incidental to promotion.

In view of the increased use of water-power and the necessity for close government supervision and co-operation in its development, it is urgent that there should be proper publicity for the fortunate position Canada enjoys in respect to "white coal." Canada occupies a unique position in this respect, for we have a supply of power for all anticipated requirements for generations to come, and of equal importance, we have our powers very fortunately located.

During the year motion pictures have been adopted as the most suitable publicity medium. The power situation in respect to the cities of Vancouver, Calgary, Winnipeg and Montreal, and the systems of the Ontario Hydro-Electric Power Commission, have all been filmed. Complete scenarios in each case are incorporated in the report of the Chief Draughtsman, under whose immediate direction the filming of the Montreal power situation and the assembling and completion of the other scenarios, was carried out. There has been a very great demand for the use of these films to date, and it is understood that the Department of Trade and Commerce, for whom they were made

by the Dominion Water Power Branch, will have them circulated by the Bureau of Commercial Economics at Washington, D.C., throughout the world, more especially through the financial centres of the United States, where most of the capital is now being obtained for financing industry in Canada.

ONE NEW POWER PLANT.

Actual construction operations have not been commenced on any new water-power projects in the Prairie Provinces during the past fiscal year. At the same time preparations are under way for the commencement of actual work at Grand Rapids where the main Saskatchewan river debouches into lake Winnipeg. At this point a development very favourable for pulp and paper purposes is feasible and will be undertaken by the Lake Winnipeg Paper Company. While the present financial stringency is causing delay in the commencement of several important and necessary water-power projects in the Prairie Provinces, delay will in the long run be advantageous. It allows the Dominion Water Power Branch an opportunity of proving beyond doubt the economic features of projects, certainly in so far as hydrometric and hydrologic data are concerned. Continuous hydrometric studies for a period of several years, and a careful analysis of future demands for power, are essential to a safe determination of the economic features of any power project. This is especially so in the rivers of the Prairie Provinces where flow conditions are apt to be very erratic and where there are competitive sources of power-producing agencies.

HYDROMETRIC SURVEYS.

The provinces of Manitoba, Saskatchewan, Alberta, and British Columbia are now included in the hydrometric work of this department. The Dominion Water Power Branch is looking after British Columbia and Manitoba; the Irrigation Branch, Alberta and Saskatchewan. All the work is being carried on under the most approved practice by qualified technical officers. While some more active co-relationship in the various organizations is desirable, the field methods now employed are satisfactory. Complete reports of the work in the provinces of Alberta and Saskatchewan are published in the regular annual Stream Measurement report of the Irrigation Branch. A complete report of the work in British Columbia by Mr. R. G. Swan, B.A.Sc., Chief Engineer of the British Columbia Hydrometric Survey, is incorporated in section 5. A complete report on the Manitoba work by Mr. M. C. Hendry, B.A.Sc., Chief Engineer of the Manitoba Hydrometric Survey, is incorporated in section 6 of this report.

WATER-POWER REGULATIONS.

A noted water-power authority in the United States has stated that owing to unsatisfactory water-power legislation the aggregate falling-off in water-power development since the year 1903, amounts to more than five million horse-power. In other words if water-power development had been properly encouraged during this period and continued at the normal rate of development prior to 1903, there would have been an additional five million horse-power at work in the United States today; the public would be fixing the rates to be paid for this great additional amount of energy and the service rendered thereby would be regulated by the State Public Utility Commissioners. Consumers would be enjoying a saving of at least $50,000,000 annually in their power bills, and most important of all, about 100,000 labourers now engaged in "following coal from the bowels of the earth to the ash pile," would be free for other more important work. Unsatisfactory water-power legislation is blamed for this apparent stagnation in the use of the water-powers of the United States.

Suitable water-power regulations for Western Canada are therefore exceedingly important. In the report of last year the need for revising the water-power regulations was pointed out. When it is remembered that the entire hydro-electric industry has grown up within the last generation it is easily understood how there are no satisfactory precedents in the laws and regulations of other countries to serve as a guide to proper procedure. The most progressive of the European countries are no further advanced in this matter than the United States and Canada.

The existing laws governing the subject in North American jurisdictions, most of them passed since 1900, are surprisingly brief and inadequate, and have been subjected to the severest criticism from both the financial interests which seek development and the public. The Dominion law, like that of the United States, governing water-powers in the public lands and forests, occupies less than a printed page of the statute books.

Practically every session of the United States Congress in the past ten years has wrestled with the subject of water-power legislation; dozens of bills have been introduced; many committee hearings with voluminous proceedings have been held; and debates have occurred which have occupied the attention of the House and Senate for weeks at a time; but no satisfactory solution has yet been agreed upon.

While the existing regulations of the Dominion, adopted by an order of the Governor in Council on the 2nd of June 1909, contain many excellent features that have been the subject of favourable comment outside of Canada, it is not surprising that they should now (1917) prove inadequate in many respects.

The legislation of the Dominion Parliament which is the authority for both the existing and the proposed regulations is contained in section 35 of the Dominion Lands Act (1908). This section, after providing for the withdrawal from ordinary disposition and sale of all Dominion lands which are valuable for water-power development purposes, simply gives the Governor in Council very broad powers to make regulations for administering the said lands and water-powers, but stipulates that in no case shall any such lands be conveyed in fee.

The primary purpose of the water-power regulations is to bring into force an administrative scheme which, while not retarding the present development of any water-powers which are ready for development, will retain the ownership and control of the powers themselves in the Crown, and will secure their utilization under conditions that will guarantee the inhabitants of the surrounding cities and districts the utmost possible benefit.

Some of the problems presented in the study of suitable water-power regulations are as follows:—

(1) Shall the water-power grant take the form of a definite term lease, or shall the form of contract known as "the indeterminate franchise" be adopted?

(2) If the definite term lease is adopted, what shall be the length of the term, and what the provisions for renewal?

(3) Shall rentals be fixed at the time a contract is executed and shall they be invariable throughout an entire period of say fifty years, or shall they be revisable at stated lesser periods? In the absence of agreement between the Minister and the licensee, in what manner and by what authority shall rentals be readjusted at the end of the term (supposing the license is renewed), or at other stated periods?

(4) Shall compensation be paid to the licensee for the water power plant if taken over by the Government at the end of the term? If so, shall actual investment cost, estimated cost of reproduction, going-concern value or some other basis of compensation be accepted?

(5) Shall the Government be compelled to take over and pay for transmission lines, sub-stations, office buildings and entire distribution systems when repossessing itself of the site at the end of the term? If so, should there be any

distinction between the principles of compensation for these properties and for works on Dominion lands?

(6) In recapturing the properties, if lands acquired in fee by the licensee are included, should the Government be privileged to purchase the lands at what they cost the licensee, or should the increment due to the enhancement of land values by reason of the progress of settlement be included?

(7) What court, commission, or other authority shall determine the extent of works to be taken over and fix the compensation to be paid therefor in case the Government exercises its right of recapture at the end of the term?

(8) What penalty shall be provided in cases of default on the part of the licensee? Shall cancellation of the license or lease ever be resorted to? If so, when, and what compensation if any, shall be paid the licensee for works constructed by him in different cases?

(9) What provision shall be made for stream-regulation and control by the Government to promote the largest measure of conservation of stream waters?

(10) What provisions, if any, for insuring reasonable rates and proper service to the customers of the public utility company utilizing a Dominion water-power?

During the past year or more certain of the members of the staff of the Water Power Branch have been quietly working on these and many other problems of like nature which must be thoroughly solved before satisfactory regulations can be evolved. Preliminary provisions covering all phases of the subject were first drafted and conferences and discussions were then held from time to time, after which a complete set of proposed regulations was prepared.

Three hundred copies of this complete draft were printed for private distribution, accompanied by an introductory note explaining its purpose and scope, and about two hundred of these have been mailed to different persons in the United States and Canada with the request that they be examined confidentially, and freely criticized. These persons included fellow water-power administrators in other Canadian provinces, in Washington, D.C., and in the State Capitals, consulting engineers, university men who have specialized on water-power problems and public utility matters, and representatives of several large operating concerns engaged in financing and constructing water-power developments.

Many letters of helpful and thoughtful criticism, representing all points of view, have been received in reply to these inquiries. At the same time a mass of invaluable material pertaining to the laws, regulations and pending legislation of other countries has been accumulated, and all this material has been carefully segregated, digested, and co-ordinated according to subject matters and the section numbers of our printed draft, in cases where divergent opinions have been expressed, and an endeavour has been made to indicate the preferable procedure.

With this intermediate stage of the work now nearing completion, the department is in a position where it can make intelligent decisions concerning correct lines of policy, and as a result of this investigation the department should be enabled to put into effect a most exemplary set of water-power regulations.

All this research work of the branch in connection with water-power regulations, has been under the supervision of Mr. H. W. Grunsky, B.A. The exceedingly satisfactory results achieved to date are entirely due to his expert legal knowledge and lengthy experience in both the engineering and legal aspects of administration and legislation problems respecting water and water-power.

NOVA SCOTIA WATER-POWERS.

During the past fiscal year, exceedingly satisfactory progress has been made in the co-operative investigations of the water-power resources of the province of Nova Scotia, being carried on by the Dominion Water Power Branch and the Nova Scotia

Water Power Commission. Mr. K. H. Smith, B.A.Sc., A.M. Can. Soc. C.E., has been in charge of this work as resident engineer of the Dominion Water Power Branch and as Chief Engineer of the Nova Scotia Water Power Commission. The work is under way at an unusual low unit cost, and will gradually be extended to thoroughly cover the whole province.

FOREIGN VISITORS.

Several distinguished visitors from foreign countries have spent some time in the branch. Prof. Boris Bakhmeteff and Prof. A. Astroff, prominent Russian engineer members of the Imperial Supply Committee in America, were officially entertained by the writer last October, and were shown the water-powers serving the Montreal market and the Hydro-Electric Power Commission system in the province of Ontario. Some time also was spent in Ottawa.

LAKE OF THE WOODS REFERENCE.

The final hearing of the International Joint Commission in this very important reference has been held, and it is understood that the report will be available in a very short time. The engineers of this branch have without reservation afforded the consulting engineers to the commission and the engineers of the various private interests affected by the reference, every possible assistance by securing for them most of the essential data covering the hydrometric and hydrologic conditions in the watershed, and the physical features of the various developed and undeveloped power sites. This data will appear subsequently in a collation by the consulting engineers to the Commission, and so far as the Lake of the Woods is concerned, form the main part of the consulting engineers' report.

THE LAKE OF THE WOODS TECHNICAL BOARD.

The function of this board is to co-ordinate the various Canadian interests and see that those interests are properly represented before the International Joint Commission in connection with the Lake of the Woods reference. After a great deal of effort involving the collation of a large amount of hydrometric, topographic and general water supply and economic data, the board succeeded in effecting a very satisfactory compromise as between the navigation, land, fishing and water-power interests. As power is the predominant interest in the watershed, it was found necessary to afford the power requirements every possible consideration. As representing the power interests of the province of Manitoba, I desire to take this opportunity of formally expressing appreciation for the assistance that has been rendered by the other members of the board in conserving the water-power possibilities of the Winnipeg river in the province of Manitoba.

APPRAISEMENTS OF WATER-POWER COMPANIES.

Anticipating the time when a full appraisement must be made of water-power companies and public utility corporations controlling water-power developments in Western Canada, advantage was taken of an opportunity of having one of the members of our staff get valuable experience by placing Mr. A. M. Beale, B.Sc., temporarily, on the staff of engineers working for the Royal Commission of Investigation into Railways and Transportation. The experience gained by Mr. Beale in this connection will ultimately be of great value to the branch. It is very satisfactory to note at the same time, that Mr. Beale's services were of considerable worth to the technical staff of the commission.

During the past year the power and storage investigations in the provinces of Alberta and Saskatchewan have mainly consisted of investigations of water-power applications, some general reconnaissance work and some special survey work in various parts of the two provinces. A detail report of this work by Mr. C. H. Attwood, Chief Engineer, is set out in section 7.

In addition to its regular departmental work in the administration of the water powers of the western provinces, the Dominion Water Power Branch has been able to render assistance to the International Joint Commission in connection with the Lake of the Woods reference, the Commission of Conservation, the provincial authorities in the province of British Columbia, the Public Utility Commissioner of the province of Manitoba and the Nova Scotia Water Power Commission. Furthermore, the writer has, since last December, enjoyed the privilege of acting as secretary of the Honorary Advisory Council for Scientific and Industrial Research.

Much substantial progress in our regular work has been achieved, and evidences of very satisfactory results along many new lines can be recorded.

No. 2.

REPORT OF THE CHIEF DRAUGHTSMAN.

B. E. Norrish M.Sc., (A.M. Can. Soc., C.E.).

DRAUGHTING ROOM.

This work consists of the compilation of original plans, maps and diagrams to illustrate the reports of the field engineers; the preparation of plans, maps and diagrams accompanying the printed reports of the branch. Proofs of all plans are read here, and instructions as to their photographic reproduction and details of lithography given. Sixteen plans were reproduced during the year. In addition to the above, many small sketches were prepared to accompany memoranda and reports of the different members of the staff.

Filing of Official Plans.—The filing system described in the 1914 report has given entire satisfaction. There are now sixteen hundred and fifty plans filed for official record and future use.

A list of plans and maps prepared for publication during the year is appended hereto.

PUBLICATION AND DISTRIBUTION OF REPORTS.

The work under this heading divides itself into three parts; first, issuing of reports embodying the results of investigations of the various members of the staff; second, the distribution of the same and third, the preparation of press bulletins.

The following table gives details regarding the number and size of the publications issued during the year:—

PUBLICATIONS ISSUED FOR FISCAL YEAR ENDING MARCH 31, 1917.

Publications.	Water Resources Paper No.	Number of Pages.	Number of Copies.	Number of Illustrations. Half-tones Line cuts.	Number of Plans and Maps. Photoliths.
Manitoba Hydrometric Survey for the Calendar Years 1912-14	4	287	2,500	27	9
Canadian Hydraulic Power Development and Electric Power in Canadian Industry, by Charles H. Mitchell, C.E	17	56	1,000	28	
British Columbia Hydrometric Survey for the Calendar Year 1915	18	446	2,500	19	1
Manitoba Hydrometric Survey for the Calendar Year 1915	19	278	2,500	23	4
Dominion Water Power Regulations with explanation		72	300	7	1
Dominion Water Power Branch Annual Report for the Fiscal Year ending March 31, 1915		228	2,500	74	11
		1,367			

During the year standards were adopted covering the size of type, style and arrangement. These standards have worked out very satisfactorily and have resulted

in more compact reports, and at a considerably less cost. A complete specification, covering the publication of Water Power Branch reports, has been based on the above. It is proposed to have this specification printed, and copies furnished the printers as a guide for future publications.

In addition to the above there is in press a report on the "Interests Dependent upon the Winnipeg River Power, with Special Reference to the Capital Invested and the Labour Employed," by H. E. M. Kensit, M.I.E.E., M. Am. Inst. E. E., M. Can. Soc. C. E., to be issued as Water Resources Paper No. 20; the Annual Report of the British Columbia Hydrometric Survey to the end of the calendar year 1916, by R. G. Swan, M. Can. Soc. C. E., Chief Engineer, to be issued as Water Resources Paper No. 21; and the Annual Report of the Manitoba Hydrometric Survey to the end of the calendar year 1916, by M. C. Hendry, A. M. Can. Soc. C. E., to be issued as Water Resources Paper No. 22.

Appended hereto is a classified list of the reports of the branch.

Distribution.—The demand for the reports of this branch has increased to such an extent that great care has to be exercised in their distribution to avoid waste. During the year the distribution list has been revised twice, and now contains about 1,600 names.

During the year 7311 reports were distributed.

PHOTOSTAT ROOM.

The photostat work executed by the branch shows an increase as compared with previous years; this increase is general and is merely due to the efficiency of our present apparatus and to the extent that photographic reproductions have been required for the illustration of the branch reports.

During the year special work has been carried on for the Imperial Munitions Board and the Wireless Branch of the Naval Service Department.

As in previous years, the branch has continued the practice of furnishing lantern slides of typical water-power developments and undeveloped water-powers throughout Canada to the Bureau of Commercial Economics, Washington, D.C., for a series of lectures in the United States on Canada's natural resources.

SPECIAL WORK.

Following instructions of August 31, 1917, regarding suitable motion picture films of the water-powers tributary to Montreal, Winnipeg, Calgary, and Vancouver, and also the system of the Ontario Hydro-Electric Power Commission, the writer personally supervised the work of the motion picture operator in the Montreal district and arranged the completion of all the scenarios.

As the field work for filming the Winnipeg, Calgary, Vancouver, and Hydro-Electric system situations was undertaken simultaneously with that for Montreal, it was not possible for the various engineers to profit by the experience gained in each case. Otherwise, much more satisfactory scenarios would have been secured. In case similar work is undertaken again, I would strongly recommend that it be undertaken in a progressive way, that is to say, one situation should be fairly well completed at a time, not only as to field work, but as to the developing and assembling of the negative.

One of the most difficult features of an industrial or educative film of this type is the prologue or introduction, especially where it is necessary to indicate clearly the location of the various power developments and sites with respect to a particular commercial centre. After much experimenting I have succeeded in developing an animated map to indicate such information. This feature of our films is exceedingly interesting, and has received much favourable comment.

In a general way the photographic work taken by the operators in the field has been fairly satisfactory, although much improvement could have been realized had the work been undertaken under the supervision of one engineer, and in a progressive way as stated above.

A detail statement of the scenarios is attached.

LIST OF MAPS AND PLANS PREPARED FOR PUBLICATION DURING THE PAST YEAR.

Title.	Accompanying.		
Plan of possible power layouts at Grand Rapids, Saskatchewan river	Annual Report for 1916.		
Map of Alberta and Saskatchewan showing Water Power and Storage Investigations, by C. H. Attwood, O.L.S., during 1915 and 1916	"	"	
Map showing Drainage Basin of the Peace river above Vermilion Chutes	"	"	
Plan showing Peace river between Peace River Crossing and Vermilion Chutes	"	"	
Sketch of possible power site on Peace river above Vermilion Chutes	"	"	
Plan of Vermilion Chutes power site on Peace river	"	"	
Topographic Sheet No. 1. Bow Falls Power site on Bow river at Banff	"	"	
Topographic Sheet No. 2. Bow Falls Power site on Bow river at Banff	"	"	
Map of Nova Scotia showing progress of stream measurements and power investigations during 1914-15, by K. H. Smith, resident engineer	"	"	
Carrot River Reclamation Project. Plan showing approximate boundary of area requiring drainage	"	"	
Carrot River Reclamation Project. Profile along the south bank of the Saskatchewan river from Sipanok channel to mouth of Carrot river	"	"	
Carrot River Reclamation Project. Profile along second meridian from Carrot river to Saskatchewan river and North bank of Carrot river from mouth to Sipanok channel	"	"	
Lowering of Lake Winnipegosis. Plan showing Lake Winnipegosis	"	"	
Lowering of Lake Winnepegosis. Topographic sheet of situa-			
Plan of Spence Lake Route Drainage Canal-Lake Winnipegosis-Lake Manitoba	"	"	
Plan showing areas in which electric current is now supplied by the Winnipeg Municipal Light and Power Department and the Winnipeg Electric Railway Company	"	"	
Plan of Greater Winnipeg Water District	"	"	
Plan of the Winnipeg Electric Railway System	"	"	
Lowering of Lake Winnipegosis. Topographic sheet of situation of Spence Lake Route Drainage Canal-Lake Winnipegosis-Lake Manitoba	"	"	
Lowering of Lake Winnipegosis. Profile Spence Lake Route Drainage Canal-Lake Winnipegosis-Lake Manitoba	"	"	
McLaren Reclamation Tract, Province of Manitoba	"	"	
Map of Southern British Columbia showing Stream Measurement Stations of the British Columbia Hydrometric Survey for the year 1915	Water Resources Paper No. 18.		
Map of Manitoba, showing Water Power and Storage Investigations of the Manitoba Hydrometric Survey for the year 1915	"	"	19.
Sketch of North American Continent showing the position of Winnipeg geographically and as a railroad centre	"	"	20.
Plan showing areas in which electric current is now supplied by the Winnipeg Municipal Light and Power Department and the Winnipeg Electric Railway Company	"	"	20.
Plan of Greater Winnipeg Water District	"	"	20.
Plan of the Winnipeg Electric Railway System	"	"	20.
Plan showing the situation of Kenora with respect to Winnipeg, Fort William and Duluth	"	"	20.

CLASSIFIED LISTS OF REPORTS.

The Reports published by the Dominion Water Power Branch, with the exception of the Annual Reports, have been called Water Resources Papers, and have been numbered 1, 2, etc.

Annual Reports previous to 1913 are included with the Annual Report of the Department of the Interior, and can be secured from the Secretary of the Department.

Annual Report for 1912-13, published 1914. Out of print.

Annual Report for 1913-14, published 1915.

Annual Report for 1914-15, published 1916.

Annual Report for 1915-16, published 1917.

Water Resources Paper No. 1.—Report of the Railway Belt Hydrometric Survey for 1911-12, by P. A. Carson, Chief Engineer. Published 1914.

Water Resources Paper No. 2.—Report of Bow River Power and Storage Investigations (Bow river west of Calgary), by M. C. Hendry, Chief Engineer in charge of surveys. Published 1914.

Water Resources Paper No. 3.—Report on Power and Storage Investigations, Winnipeg river, by J. T. Johnston, Chief Hydraulic Engineer, Dominion Water Power Branch. Published 1915.

Water Resources Paper No. 4.—Report of the Manitoba Hydrometric Survey to end of year 1914, by M. C. Hendry, Chief Engineer. Published 1916.

Water Resources Paper No. 5.—Preliminary Report on the Pasquia Reclamation Project, by T. H. Dunn, Chief Engineer in charge of Reclamation Survey. Published 1914. Out of print.

Water Resources Paper No. 6.—Report on cost of various sources of power for pumping in connection with the South Saskatchewan Water Supply Diversion Project, by H. E. M. Kensit. Published 1914. Out of print.

Water Resources Paper No. 7.—Report on the Manitoba Water Powers, by D. L. McLean, S. S. Scovil, and J. T. Johnston, compiled for the Manitoba Public Utilities Commission. Published 1914.

Water Resources Paper No. 8.—Report of the British Columbia Hydrometric Survey for 1913, by R. G. Swan, Chief Engineer. Published 1915.

Water Resources Paper No. 9.—Report of Red River Navigation Surveys, by S. S. Scovil, Assistant Chief Engineer of Manitoba Hydrometric Survey. In course of preparation.

Water Resources Paper No. 10.—General Guide for Compilation of Water Power Reports of Dominion Water Power Branch, prepared by J. T. Johnston, Chief Hydraulic Engineer. Published 1915. Limited edition.

Water Resources Paper No. 11.—Final Report on the Pasquia Reclamation Project, by T. H. Dunn, Chief Engineer in charge of Reclamation Survey. Published 1915.

Water Resources Paper No. 12.—Report on Small Water Powers in Western Canada, and discussion of sources of power for the Farm, by A. M. Beale. Published 1915.

Water Resources Paper No. 13.—Report on the Coquitlam-Buntzen Hydro-Electric Development, by G. R. G. Conway, Chief Engineer of the British Columbia Electric Railway Company, Limited. Published 1915.

Water Resources Paper No. 14.—Report of the British Columbia Hydrometric Survey for 1914 by R. G. Swan, Chief Engineer. Published 1915.

Water Resources Paper No. 15.—Report on the Water Powers of Alberta and Saskatchewan by C. H. Attwood, Chief Engineer Alberta and Saskatchewan Power Surveys. In course of preparation.

Water Resources Paper No. 16.—Water Powers of Canada. A series of five pamphlets in one volume covering the water power situation in Canada prepared for distribution at the Panama-Pacific Exposition, San Francisco, 1915, by G. R. G. Conway, Consulting Engineer, Toronto; Percival H. Mitchell, Consulting Engineer, Toronto; H. G. Acres, Hydraulic Engineer Hydro-Electric Power Commission, Ontario; F. T. Kaelin, Asst. Chief Engineer, Shawinigan Power Co., Montreal, Quebec; K. H. Smith, Engineer, Nova Scotia Water Power Commission, Halifax, N.S. Published 1915.

Water Resources Paper No. 17.—Canadian Hydraulic Power Development and Electric Power in Canadian Industry, by Percival H. Mitchell, Consulting Engineer to Dominion Water Power Branch. Published 1916.

Water Resources Paper No. 18.—Report of the British Columbia Hydrometric Survey for 1915, by R. G. Swan, Chief Engineer. In press.

Water Resources Paper No. 19.—Report of the Manitoba Hydrometric Survey for 1915, by M. C. Hendry, Chief Engineer. In press.

Water Resources Paper No. 20.—Report on the Interests Dependent on Winnipeg River Power, with Special Reference to the Capital Invested and the Labour Employed, by H. E. M. Kensit. In press.

Water Resources Paper No. 21.—Report of the British Columbia Hydrometric Survey for 1916, by R. G. Swan, Chief Engineer. In press.

Water Resources Paper No. 22.—Report of the Manitoba Hydrometric Survey for 1916, by M. C. Hendry, Chief Engineer. In press.

MOTION PICTURES—WATER POWERS OF CANADA.

Scenario No. 1.—Tributary to Vancouver, B.C., two reels 1,702 feet, requires thirty minutes to screen.

" No. 2.—Bow River, Alberta, one reel 1,085 feet, requires fifteen minutes to screen.

SESSIONAL PAPER No. 25

MOTION PICTURES—WATER POWERS OF CANADA.—*Continued.*

Scenario No. 3.—Winnipeg River, Province of Manitoba, two reels 1,579 feet, requires thirty minutes to screen.
" No. 4.—Hydro-Electric Power System in Ontario, incomplete.
" No. 5.—Tributary to the City of Montreal, Quebec, three reels 2,530 feet, requires forty minutes to screen.

SCENARIO NO. 1.

WATER-POWERS OF CANADA TRIBUTARY TO VANCOUVER, B.C.

Produced under the direction of the Dominion Water Power Branch, Department of the Interior, for the Department of Trade and Commerce.

Prologue.

Title.—"To gather the streams from waste and to draw from them energy, labour without brains, and so to save mankind from toil that it can be spared, is to supply what, next to intellect, is the very foundation of all our achievements and all our welfare."—Justice Holmes.
Title.—Vancouver, the largest Canadian port on the Pacific Coast, has within reasonable distance undeveloped water-power aggregating 750,000 horse-power.
Scene.—Government engineers making a discharge measurement at Campbell river gauging station.

VANCOUVER POWER COMPANY.

Lake Coquitlam.

Scene No. 1.—Schuyler Falls at the head waters of Coquitlam Lake.
" 2.—Coquitlam Lake.
" 3.—The main storage of the Coquitlam-Buntzen Development.
" 4.—Location 503 feet above sea level.
" 5.—The hydraulic fill dam at the outlet of Coquitlam Lake, the largest of its kind in Canada.
" 6.—During construction and when completed.
" 7.—The stored water entering the 2½ mile rock tunnel from Lake Coquitlam and discharging from tunnel into Lake Buntzen at an elevation of 400 feet above sea level.

Lake Buntzen.

Scene No. 1.—Lake Buntzen.
" 2.—Concrete dam and control gates with steel penstocks leading to Power-house No. 1.
" 3.—Intake control house and penstocks leading to Power-house No 2

Power-houses Numbers 1 and 2.

Scene No. 1.—Power-house No. 1, left.
" 2.—Power-house No. 2, right.
" 3.—Power-house No. 1 from the sea, housing 45,000 horse-power.
" 4.—Power-house No. 2 from the sea, housing 40,000 horse-power.
" 5.—High tension transformers.
" 6.—Hydro-electric generators, 13,500 horse-power units.
" 7.—High tension switch room.

Transmission Lines.

Scene.—60,000-volt transmission lines leading to Vancouver sub-station, showing transmission line crossing Burrard Inlet at Barnet, span 2,843 feet. Height of receiving tower, 132 feet.
Title.—Vancouver also receives power from the Western Canada Power Company plant on the Stave River generating (October, 1916) 37,500 horse-power.

WESTERN CANADA POWER COMPANY.

Scene No. 1.—Birdseye view of existing and proposed development on Stave River, total capacity 100,000 horse-power.
" 2.—Main storage Stave Lake.
" 3.—Concrete dam at Stave Falls showing control gate.
" 4.—Power-house.
" 5.—Second half in course of construction. (August, 1916.) Head, 120 feet.
" 6.—Switch gallery and exciter units.
" 7.—Hydro-electric generators, 12,500 horse-power.
" 8.—60,000 volt transmission line leading to Vancouver.
" 9.—Site of proposed additional 50,000 horse-power development on Stave River, two miles below existing plant.

MOTION PICTURES—WATER POWERS OF CANADA.—*Continued.*

APPLICATION OF HYDRO-ELECTRIC POWER IN THE FRASER VALLEY DISTRICTS.

Scene No. 1.—Cloverdale sub-station of the British Columbia Electric Railway Company distributing energy to the valley.
" 2.—Loading and hauling logs to mill.
" 3.—An electrically operated lumber mill at White Rock.

Electricity on the farm, Fraser Valley.

Scene No. 1.—Milking by electricity.
" 2.—Transferring milk to dairy.
" 3.—Chickens hatched by electricity.
" 4.—British Columbia Electric Railway Company's express milk train to Vancouver.
" 5.—Milk train on way to Vancouver crossing Pitt River bridge.

Vedder Mountain Sub-station of the British Columbia Electric Railway Company feeding the eastern end of the Fraser Valley.

Scene No. 1.—Vedder Mountain Sub-station.
" 2.—Electric train leaving Chilliwack.
" 3.—Eastern Terminal of the Fraser Valley line of the British Columbia Electric Railway Company.
" 4.—Train crossing Fraser River bridge at City of New Westminster, thirteen miles from Vancouver.

CITY OF NEW WESTMINSTER.

Scene No. 1.—British Columbia electric depot at New Westminster.
" 2.—Street scenes in New Westminster and a panoramic view of the city.

CITY OF VANCOUVER.

Scene No. 1.—The British Columbia Electric Railway Company's head office and depot at Vancouver.
" 2.—Street scenes of Granville and Hastings streets.
" 3.—Canadian Pacific Terminal and Water Front.
" 4.—Grand Trunk Pacific ss. *Prince Rupert* returning from Alaska.
" 5.—Panoramic view of the city taking in North Vancouver and scene of Vancouver at night.

CONCLUSION.

"Water-power has played a most important role in the industrial development of Canada. No country is more fortunate in the extent and location of its 'white coal.' Practically every commercial centre has abundance of water-power available, not only for present needs, but for all anticipated requirements."

DOMINION OF CANADA.

(Coat of Arms.)

SCENARIO NO. 2.

WATER-POWERS OF CANADA, BOW RIVER, ALBERTA.

Produced under the direction of the Dominion Water Power Branch, Department of the Interior, for the Department of Trade and Commerce.

Prologue.

Title.—"To gather the streams from waste and to draw from them energy, labour without brains, and so to save mankind from toil that it can be spared, is to supply what, next to intellect, is the very foundation of all our achievements and all our welfare."
—Justice Holmes.

Title.—The Bow River rises in the Rocky Mountains National Park of Canada, flows through the foothills out on the Alberta prairies where its waters irrigate vast tracts. Government power surveys show that, with storage regulations, over 60,000 commercial horse-power can be developed at six sites on the Bow River in the foothills within fifty miles of Calgary.

SOURCES OF BOW RIVER.

Scene No. 1.—Bow Lake with the snow clad peaks and glaciers of the Rockies is the source of the Bow River.
" 2.—Hector Lake.
" 3.—Lake Louise and the Lakes in the Clouds "typical" feeders of Bow River.
" 4.—Banff, Alberta, and Mount Rundle.
" 5.—Lake Minnewanka. The first Bow River storage reservoir to be constructed. Capacity, 44,700 acre feet.
" 6.—Minnewanka Storage Dam.
" 7.—Bow Falls, Banff. A beauty spot on the Bow River in the Rocky Mountains National Park.

SESSIONAL PAPER No. 25

MOTION PICTURES—WATER POWERS OF CANADA.—*Continued.*

CALGARY POWER COMPANY.

Title.—Two of the six power sites on the Bow River are developed. The first at Horseshoe Falls where the Calgary Power Company has (August, 1916), 19,500 horse-power installed.
Scene.—Horseshoe Falls Development.
Title.—The second development is at Kananaskis Falls where the Calgary Power Company has (August, 1916), 11,600 horse-power installed.
Scene.—Kananaskis Falls Development.

CITY OF CALGARY, ALBERTA.

Title.—Calgary, Alberta. The City of Calgary, Alberta, enjoys great advantages from the available water-power.
Scene.—Views of the City of Calgary, Alberta.

CONCLUSION.

Water-power has played a most important role in the industrial development of Canada. No country is more fortunate in the extent and location of its 'white coal.' Practically every commercial centre has abundance of water-power available, not only for present needs, but for all anticipated requirements.

DOMINION OF CANADA.

(Coat of Arms.)

SCENARIO No. 3.

WATER-POWERS OF CANADA, WINNIPEG RIVER, PROVINCE OF MANITOBA.

Produced under the direction of the Dominion Water Power Branch, Department of the Interior, for the Department of Trade and Commerce.

Prologue.

Title.—"To gather the streams from waste and to draw from them energy, labour without brains, and so to save mankind from toil that it can be spared, is to supply what, next to intellect, is the very foundation of all our achievements and all our welfare."
—Justice Holmes.
Title.—In Manitoba the Winnipeg river falls 270 feet, which government surveys show can be concentrated for power at eight sites, all within 75 miles of Winnipeg, with total capacity over 420,000 24-hour horse-power.

WINNIPEG ELECTRIC RAILWAY COMPANY.

Title.—Two of the eight power sites are developed—The first by the Winnipeg Electric Railway Company transmitting 30,000 horse-power to Winnipeg.
Scene.—Winnipeg Electric Railway Company's Development on the Pinawa Channel on Winnipeg River.

WINNIPEG MUNICIPAL PLANT.

Title.—The second developed site is the municipal plant of Winnipeg with an ultimate capacity of 100,000 horse-power now (June, 1916), transmitting 25,000 horse-power, 75 miles for use around Greater Winnipeg.
Scene.—City of Winnipeg power development at Point du Bois falls on the Winnipeg river.

UNDEVELOPED WATER-POWERS.

Title.—The six undeveloped sites are all under Dominion Government control. Three are on the upper stretches of the river.

Slave Falls Site.

Scene No. 1.—Slave Falls, 44,000 horse-power.
" 2.—Model of proposed development at Slave Falls.

Government Gauging Station.

Title.—Immediately above Slave Falls is the Government gauging station where the flow of the river is measured.
Scene.—Engineer in the act of taking a meter measurement.
Title.—The second and third undeveloped sites are at Upper and Lower Seven Sisters Falls. Under regulated flow conditions 68,000 horse-power, can be realized.

MOTION PICTURES—WATER POWERS OF CANADA.—*Continued.*

Upper Seven Sisters Site.

Scene No. 1.—Upper Seven Sisters Falls, 30,000 horse-power.
" 2.—Model of proposed development at Upper Seven Sisters Falls.

Lower Seven Sisters Site.

Scene No. 1.—Lower Seven Sisters Falls, 38,000 horse-power.
" 2.—Model of proposed development at Lower Seven Sisters Falls.
Title.—The fourth, fifth and sixth undeveloped sites are on the lower stretch of the river between Lac du Bonnet and Lake Winnipeg.

McArthur Falls Site.

Scene No. 1.—McArthur falls, 31,000 horse-power.
" 2.—Model of proposed development at McArthur Falls.

Du Bonnet Falls Site.

Title.—The Du Bonnet Falls site is the largest on the river, 96,000 24-hour horse-power.
Scene No. 1.—Du Bonnet Falls.
" 2.—Model of proposed development at Du Bonnet Falls.

Pine Falls Site.

Title.—Pine Falls site has direct water transportation facilities on Lake Winnipeg and is particularly well adapted for pulp and paper manufacturing.
Scene No. 1.—Pine Falls, 83,000 horse-power.
" 2.—Model of proposed development at Pine Falls.

CITY OF WINNIPEG.

Title.—Few cities enjoy greater advantages from water-power than Winnipeg. Rates for light, heat and power are exceptionally low. There is sufficient power available for 3,000,000 people.
Scene No. 1.—Winnipeg receiving station.
" 2.—Canadian Pacific Railway Hotel and Terminal.
" 3.—Grand Trunk Pacific Railway Hotel. The Fort Garry. Old Fort Garry in foreground.
" 4.—Canadian Northern and Grand Trunk Pacific Railway Union Station.
" 5.—Winnipeg, the gateway to the Canadian prairies.
" 6.—Main street, Winnipeg, at night.

CONCLUSION.

Water-power has played a most important role in the industrial development of Canada. No country is more fortunate in the extent and location of its "white coal." Practically every commercial centre has abundance of water-power available, not only for present needs but for all anticipated requirements.

DOMINION OF CANADA.

(Coat of Arms.)

SCENARIO NO. 5.

WATER POWERS OF CANADA TRIBUTARY TO MONTREAL, QUEBEC.

Produced under the direction of the Dominion Water Power Branch, Department of the Interior, for the Department of Trade and Commerce.

Prologue.

Title.—"To gather the streams from waste and to draw from them energy, labour without brains, and so to save mankind from toil that it can be spared, is to supply what, next to intellect, is the very foundation of all our achievements and all our welfare."
—Justice Holmes.
Title.—Montreal, the commercial metropolis of Canada derives its power from seven outlying hydro-electric developments with a total capacity of 500,000 horse-power of which there is transmitted for use within Montreal (August, 1916), over 125,000 horse-power.

MONTREAL LIGHT, HEAT AND POWER COWPANY.

Richelieu River Development.

Title.—The Richelieu River Development at Chambly commenced operation in 1899, under 33-foot head. The present output (August, 1916), is 20,000 horse-power.
Scene No. 1.—Dam and power-house.
" 2.—Generator floor.
Title.—Four of the developments are in the rapids of the St. Lawrence river, each using but a small portion of the river flow.

MOTION PICTURES—WATER POWERS OF CANADA.—*Continued.*

Lachine Rapids Development.

Title.—The Lachine Rapids Development commenced operation in 1898 under a head of 15 feet. The present output (August, 1916), is 14,000 horse-power.
Scene No. 1.—Intake to power canal and power-house.
" 2.—Lachine Rapids.
" 3.—A 1,500 horse-power generator direct connected to six low head water wheels.
Title.—The Soulanges, Cedars Rapids and St. Timothee Developments are close together.
Scene.—Panoramic view showing Soulanges, Cedars Rapids and St. Timothee Developments.

Soulanges Development.

Title.—The Soulanges Development under a head of 50 feet commenced operation in 1909. The present output (August, 1916), is 15,000 horse-power.
Scene No. 1.—Intake to power canal.
" 2.—Power-house.
" 3.—Generator floor.

Cedars Rapids Development.

Title.—The Cedars Rapids Development commenced operation in 1916 under a head of 30 feet. The present output (August, 1916), is 110,000 horse-power. The ultimate development will be 200,000 horse-power.
Scene No. 1.—Intake to Power Canal.
" 2.—Gates and racks.
" 3.—Generator floor, nine 12,500 horse-power generators.
" 4.—Low tension switchboard which receives power from generators and distributes to transformer station.
" 5.—Transformer station, where power is stepped up to high voltage for transmission purposes.
" 6.—Oil switches.
" 7.—High tension transformers stepping the voltage from 6,600 volts to 120,000 volts.
" 8.—High tension aluminium bus bars from which transmission lines are supplied with power at 120,000 volts.
" 9.—Transmission lines to Montreal.
" 10.—Storage battery room where power is constantly stored for emergency operation of oil switches, turbine governors and for field excitation.
Title.—Cedars Development, Rapids King shooting Cedars Rapids, St. Lawrence river—St. Timothee Development across the river.
Scene.—Panoramic view.

CANADIAN LIGHT AND POWER COMPANY.

St. Timothee Development.

Title.—The St. Timothee Development commenced operation in 1911 under 50-foot head. The present output (August, 1916), is 30,000 horse-power.
Scene No. 1.—Intake to Power-house and power canal.
" 2.—Generator floor—four 7,500 horse-power machines.
Title.—Two of the developments are on the St. Maurice river about 100 miles from Montreal.

SHAWINIGAN WATER AND POWER COMPANY.

Shawenegan Falls Development.

Title.—The Shawenegan Falls Development consists of four separate plants operating under 145-foot head with present output (August, 1916), 200,000 horse-power, and ultimate output of 300,000 horse-power.
Title.—Much of this power is used locally for extensive electro-chemical industries, about 60,000 horse-power is (August, 1916), transmitted to Montreal.
Scene No. 1.—Dam and falls.
" 2.—Intake.
" 3.—Steel penstocks leading to power-house No. 2, 14 feet in diameter and incased in concrete.
" 4.—Turbine floor—20,000 horse-power turbines.
" 5.—Generator floor—20,000 horse-power units.
" 6.—Operating and distribution switchboard.
" 7.—110,000 volt transmission line leading to Montreal and district.

LAURENTIDE COMPANY.

Grand'Mère Development.

Title.—The Grand'Mère Water-power originally used for pulp and paper purposes has recently been developed electrically. Its present capacity is now (August, 1916), 120,000 horse-power, part of which is already being marketed.

MOTION PICTURES—WATER POWERS OF CANADA—*Concluded.*

LAURENTIDE COMPANY—*Con.*

Grand'Mère Development.—Con.

Title.—Grand'Mère derives its name from a rock in the falls on the St. Maurice which bears a perfect profile of a grandmother's face.
Scene.—Rock.
Title.—To foster pride, loyalty and contentment among its several thousand employees the company has spent large sums in community enterprises, clubs, auditoriums, schools, homes and parks. All community and private property development conform to an elaborate town planning scheme.
Scene No. 1.—General offices of the company.
" 2.—The Laurentide Inn, home for single employees.
" 3.—Auditorium.
" 4.—Employees Club.
" 5.—Spillway Dam.
" 6.—Upstream view of power-house before the water has been raised to proposed level.
" 7.—Generator floor six 20,000 horse-power units.
" 8.—Aluminum bus bars supplying 6,000-volt current to Distribution System.
" 9.—Grinding room, pulp mill, each motor 2,800 horse-power.
Title.—There is practically unlimited water-power available within transmission range of Montreal, especially in the rapids of the St. Lawrence, Ottawa and St. Maurice rivers and their important tributaries.
Scene.—Transmission lines entering Montreal.
Title.—St. Timothee Receiving Station.
Scene No. 1.—Exterior view of station.
" 2.—Bank of transformers stepping down from 44,000 to 13,200 volts for city use.
Title.—Cedars Rapids Receiving Station.
Scene No. 1.—Exterior view of station.
" 2.—Bank of transformers stepping down from 66,000 volts to 13,200 volts for city use.
Title.—Shawenegan Receiving Station.
Scene No. 1.—Exterior view of station.
" 2.—20,000 horse-power transformers stepping down from 110,000 volts to 13,200 volts for city use.
Scene.—Central Station distributing 30,000 horse-power at Montreal.
Title.—Montreal, situated at the head of ocean going navigation and at the base of the Canadian Great Lakes Canal System, has excellent harbour facilities.
Scene No. 1.—Factories using over 12,000 horse-power (hydro-electric).
" 2.—Financial District, St. James street.
" 3.—Business Section, St. Catherine street.
" 4.—Montreal from the Mountain.

CONCLUSION.

Water-power has played a most important role in the industrial development of Canada. No country is more fortunate in the extent and location of its "white coal." Practically every commercial centre has abundance of water-power available, not only for the present needs but for all anticipated requirements.

DOMINION OF CANADA.

(Coat of Arms.)

No. 3.

REPORT OF THE ACCOUNTANT.

PERCY WILKINSON.

ACCOUNTS.

The administration of the Dominion Water Power appropriation has been carried on in the same manner as in previous years, the year being divided into four periods of three months. Advances are made to each of the chief engineers in charge of field parties, upon their furnishing the office at Ottawa with a statement on a prescribed form, showing in detail for what purposes the advance is required. At the end of each period of three months, the accounts covering the expenditures of the period are prepared and submitted to the Ottawa office, together with the requisition for the further advance necessary to cover the expenditures of the succeeding period. Upon the receipt of these accounts in Ottawa, they are carefully checked and when considered to be in order, are submitted to the superintending accountant for final examination.

The following statement shows the number of accounts dealt with during the year, the total amount of such accounts and the number of cheques forwarded:—

Number of accounts dealt with	613
Amount of accounts	$142,545.40
Number of cheques forwarded	947

APPROPRIATIONS.

The sum of $164,000 was appropriated by Parliament to defray the costs of the administration of water-power regulation. The provincial legislatures of British Columbia and Nova Scotia continued to co-operate with us in a financial way, contributing approximately the same amounts respectively as last year, viz., five thousand and three thousand dollars, towards defraying the expenses in connection with administration and investigation in the provinces named.

STAFF.

Numerous changes have occurred in the personnel of the staff of the Branch during the fiscal year, including transfers from and to the branch and enlistments for service with the Overseas forces.

The following is a list of the names of members of the staff of the branch who enlisted during the fiscal year: H. Boyd; G. Foote; B. B. Hogarth; G. Milnes; C. E. Richardson; G. H. Wood.

Altogether, there are thirty-five members of the staff of this branch serving with the military forces.

Three members of the staff have given up their lives in the cause of the Empire, viz., Charles Penner Cotton, Walter Henry Bartlett and Eyre Morton Dann.

No. 4.

REPORT OF THE CHIEF HYDRAULIC ENGINEER, I. T. JOHNSTON, B.A.S.c., C.E. (Tor.), M. Can. Soc. of C.E.

HYDROMETRIC SURVEYS.

The regular stream measurement work has been continued in the province of British Columbia under Mr. R. G. Swan as chief engineer, and in Manitoba under Mr. M. C. Hendry as chief engineer. The co-operative arrangement made with the Nova Scotia Water Power Commission in 1915 has been continued with most gratifying results, a very thorough power and storage investigation supplemented by extensive stream measurement studies being actively prosecuted in that province with mutually satisfactory results to the Provincial and Federal Governments. Owing to the very heavy reductions in staff, as a result of enlistments for overseas service, there has been a necessary curtailment of field operations; however, it is considered that the most pressing records of stream flow ae being secured.

BRITISH COLUMBIA HYDROMETRIC SURVEY.

The British Columbia Hydrometric Survey under Mr. R. G. Swan, has continued its work in co-operation with the Provincial Government along the lines outlined in previous reports. The necessity of practising the strictest economy in maintenance combined with the shortage of staff has prevented any extension of the field studies. The new work established in the Fort George district was continued as energetically as the conditions would permit. The work in this district is considered to be of exceptional importance to the future development of this section of the province, the opening up of which has been hastened by recent railway construction.

The organization has worked in co-operation with the British Columbia Lands Branch and with the Dominion Parks Branch, with mutually satisfactory results. Mr. Swan's organization has enabled him to prepare and submit numerous engineering reports on water supply, irrigation, drainage and foreshore, with a minimum of expenditure in the field. The co-operation with the Provincial Water Rights Branch, both in work and finance, which has been in operation since 1914 has been continued throughout the year with marked success. Very complete water supply data have been furnished to the Commission of Conservation.

Attention might be called to the efficient organization of the work set out in Mr. Swan's complete report (No. 5) attached hereunder.

The stream measurement report for the year 1915 has been published as "Water Resources Paper No. 18". Material for the report covering the year 1916 is now prepared and will be submitted to the King's Printer at an early date. It will be published as "Water Resources Paper No. 21". These reports are available for free distribution to all interested in problems affected by the run-off of the rivers in British Columbia.

MANITOBA HYDROMETRIC SURVEY.

The regular stream measurement work in the province of Manitoba has been continued throughout the year under Mr. M. C. Hendry. Mr. Hendry's complete report (No. 6) is attached hereunder, and covers fully the extent and scope of the work carried on by the Manitoba Hydrometric Survey.

As in the case of British Columbia it has here been necessary to confine the work to the stations already established, owing to enlistments from the staff for overseas service. Every effort has been directed towards maintaining stations at the points considered to be of most urgent primary importance.

Reconnaissance studies of the rivers on the eastern shore of lake Winnipeg and in the northern section of the province have been continued. Every effort is being directed to secure as reliable data as possible concerning the run-off of the power rivers in the unsettled portions of the province, in order to satisfactorily advise on their future development, a development upon which the industrial future of this section of the province will very largely depend. To this end, special attention was given to the Nelson river at Manitou rapids and to the Saskatchewan river at Grand rapids.

The run-off studies carried on at the outlets of the Lake of the Woods in the interests of the Winnipeg River powers and in connection with the Lake of the Woods reference before the International Joint Commission, were continued throughout the year. The flood conditions obtaining on the lake throughout June and July and the necessity of securing very complete information in connection with the same made a heavy demand upon the Winnipeg office staff.

The work of the survey has been carried on with the greatest economy throughout the entire season and the results obtained speak well for the efficiency of the organization and for the efforts made by Mr. Hendry's greatly reduced staff.

The first Stream Measurement Report of the Survey covering the stream measurement work complete to the end of 1914 has been published as "Water Resources Paper No. 4". A second report covering the data for the year 1915 is being published as "Water Resources Paper No. 19", and will be available for distribution at an early date. Material for the report covering the year 1916 is now prepared and will be submitted to the King's Printer within the next few weeks. It will be published as "Water Resources Paper No. 22". These reports are available for free distribution to all interested in problems affected by the run-off of the rivers in the province of Manitoba .

The Manitoba Hydrometric Survey has co-operated closely with Mr. T. H. Dunn, reclamation engineer, in his drainage investigations throughout the province.

POWER AND STORAGE SURVEYS.

Investigations into the power and storage resources of Alberta and Saskatchewan were continued during the past season by a reconnaissance party under Mr. C. H. Attwood as chief engineer. It has not, however, been possible to continue the work in these provinces as aggressively as in the past in view of the necessity for economy and owing to shortage of field staff.

MANITOBA.

Few additional power investigations were made throughout the province of Manitoba during the past season. The work was confined to a continuation of studies commenced in previous years. A close supervision was maintained over the Winnipeg River situation and many valuable records of high water and general river flow conditions were secured during the flood period. The exceptional run-off during 1916, supplied records of higher discharge than had previously been secured by the organization. These records form a most valuable addition to the data now available in the department for the consideration of the power reach of the Winnipeg river, and of the power developments, existing and prospective, connected therewith.

Close touch was kept with the discharge of the Saskatchewan river in connection with the proposed power development at Grand rapids, and records of the discharge during the higher stages were secured both at Pas and at the head of the rapids. In

the interests of the future development of the Nelson river, as complete records as possible were secured of the higher stages at Manitou rapids.

Storage studies on the Lake of the Woods and Lac Seul, in connection with possible reservoirs throughout the province of Manitoba, were continued. Reports were completed covering the reconnaissance surveys made during the preceding years on the Grass and Burntwood rivers in the northern portion of the province. These rivers are now readily accessible as a result of the opening up of the country by the Hudson Bay Railway. No new reconnaissance survey work was undertaken.

ALBERTA AND SASKATCHEWAN.

The power and storage investigations in the province of Saskatchewan and Alberta have been continued under Mr. C. H. Attwood. Mr. Attwood's full report (No. 7) is appended, and concisely covers the scope of the work accomplished during the season. With the limited funds available a very satisfactory season's work was accomplished. The principal situations covered and work accomplished in the field were as follows:—

1. The establishment of permanent bench-marks at the power sites on the Bow river.
2. Investigation of the power possibilities of Pine creek in section 15, township 65, range 21, west of the 4th meridian.
3. Investigation of the power possibilities of Scoop rapids on the Sturgeon-weir river in northern Saskatchewan.
4. A reconnaissance survey of the power possibilities of the Churchill river at Kettle falls and Bloodstone falls in Saskatchewan and Manitoba.
5. A power survey of Crowsnest falls on the Crowsnest river about two miles west of Lundbreck, Alberta.
6. An inspection of the power possibilities of Frog creek in fractional section 17, township 56, range 3, west of the fourth meridian.

Of the above investigations, those of the Crowsnest, Sturgeon-weir, and Churchill rivers were the most extensive. Work on the Churchill river was only discontinued in sufficient time to enable Mr. Attwood's party to withdraw before the setting in of winter.

A special demand has arisen for power data in the district of the Churchill and Sturgeon-weir rivers as a result of the mining activities to the northwest of Pas, Manitoba. The data secured by Mr. Attwood has given the department a good grasp of the general power situation in the district in closest connection with the mining area.

All the investigations made were of a reconnaissance nature with a very light field party and were carried to completion with the utmost economy.

The general administrative policy of the branch has been continued. Engineering inspections have been made of all power projects and applications, in accordance with the usual practice, and preliminary to further action by the department. Every assistance has been supplied to applicants for water-power privileges, and particular attention has been given to the developers of small local water-powers. Practical advice and information secured first hand from a responsible departmental engineer is greatly appreciated by applicants for the smaller powers. The exact conditions governing the development in each case are supplied to the applicant and erroneous estimates of the power available are corrected. The policy is in brief, to encourage the development of desirable power undertakings and to discourage and prevent the development of wasteful and uneconomical projects.

RECOMMENDATIONS FOR FUTURE WORK.

During the continuance of war conditions it is not considered that an aggressive campaign of power investigation should be continued in the more remote districts. It is considered that attention should be confined to the problems pressing for immediate consideration. Looking forward, however, to the resumption of a more aggressive campaign, the following investigations are considered advisable:—

1. The reconnaissance power survey of the English river which has been carried to Separation lake should be continued to the junction with the Winnipeg river, in order to close the gap which now exists in the plans and records covering the main branches of the Winnipeg River system.

2. The line of precise levels along the Winnipeg river which has been partially completed should be continued to cover the entire power reach in Manitoba.

3. Systematic investigation into the more northern rivers of the three Prairie Provinces should be continued. This work can be carried on very economically by reconnaissance investigation.

4. Arrangements should be made in the future for the systematic covering of all those sections and rivers in the more settled portions of the Prairie Provinces which have been omitted from the investigations to date.

NOVA SCOTIA POWER AND STORAGE INVESTIGATIONS.

The co-operative agreement between the Nova Scotia Power Commission and this department, looking to the investigation of the power resources of the province of Nova Scotia has been continued throughout the past season. The work is under the direction of Mr. K. H. Smith of this branch as resident engineer, and has been entirely satisfactory both to the commission and to this department.

Much more complete information relative to the power and storage situation in the province has been secured than had been considered possible with the limited funds and staff available. Mr. Smith's complete report (No. 8) is appended, and covers the outline of the work carried on throughout the season.

Power surveys and investigations have been carried out on the following streams: Bloody creek, Dartmouth lakes, East river Sheet harbour, Fall river, Gaspereaux river, Gold river, Indian and Northeast rivers, Kearney lakes, Lequille river, Liscomb river, Paradise river, Pennant river, Sackville river, West river, Sheet harbour, Profiles of the rivers investigated have been secured either by Mr. Smith's staff or from surveys made by private parties. The power studies have included surveys of all available storage reservoirs in the watersheds of the rivers investigated. The investigation in the field of each river taken in conjunction with the continuous stream run-off records being secured, gives a very complete index to its power potentialities.

Regular stream measurement stations are established on the following rivers: Archibald brook; Bear river, East branch; East river Pictou, West branch; East river, Sheet harbour; Fall harbour; Fall river; Gaspereaux river; Gold river; Indian river; Lahave river (Bruhms bridge); Lahave river (Morgan's falls); Lequille river; Liscomb river; Liverpool river; Margaret river; Medway river; Musquodoboit river; Nictaux river; Northeast river; Paradise river; Philip river; Roseway river; Sackville river; Sissiboo river; Stewiacke river; St. Croix river; St. Mary river; Tusket river. In addition many additional miscellaneous measurements were made in the different localities.

A progress report was prepared for the Nova Scotia Water Power Commission covering in detail the entire hydrometric and water-power investigations in Nova Scotia up to September 30, 1916, the end of the provincial fiscal year. This report

has been printed by the commission and forms a complete record of the studies made to date. The Nova Scotia Water Power Commission has expressed itself as being greatly pleased with the progress of the investigation to date, and the work has been continued under the present co-operative arrangement during the present fiscal year. It is hoped that the work will be prosecuted until all power rivers in the province have been fully studied and classified.

RECLAMATION.

Mr. T. H. Dunn, C.E., O.L.S., has continued the reclamation investigations outlined in last year's annual report. His full report is attached hereunder (No. 9) and gives briefly the scope of his work and his conclusions.

The work in the Carrot River district was continued along lines followed in the previous year's investigations. The more detailed studies have shown that more extensive embanking than had previously been considered necessary will be required to carry out the proposed reclamation project. The project is, however, considered feasible and worthy of further investigation. Investigation was continued into the proposed lowering of lake Winnipegosis for the purpose of reclaiming the low lands lying along the western and northern shores. Reconnaissance survey of the lake shores indicated that less land would be benefitted by the lowering of the lake than had been generally assumed. The method of reclamation proposed is the lowering of the lake by means of a canal cut across Meadow portage to lake Manitoba. From an engineering standpoint, no difficulties will be experienced and the development of the reclamation project in conjunction with a power and navigation scheme is entirely feasible; such a development would make the reclamation project entirely sound from a financial standpoint. It is doubtful whether the reclamation project alone could be profitably proceeded with at the present time.

A considerable portion of Mr. Dunn's time was devoted to matters arising from the Lake of the Woods reference before the International Joint Commission. In conjunction with a reclamation engineer of the Ontario Government he has made all the investigations necessary for the Lake of the Woods Technical Board regarding the land phase of the reference. During the past season he has carried on an investigation on the ground into the high water conditions obtaining on the Lake of the Woods during June, July, and August of last season, and into the effects on the low lands bordering on the lake, particularly on the southwest shore. It is probable that Mr. Dunn's detail knowledge of this whole situation and his extensive knowledge with regard to the reclamation of the lands will be availed of by the Government continuously for some time, while the land phase of the Lake of the Woods reference is being dealt with.

No work was possible on the McLaren tract during the past season owing to the smallness of the staff available. It is considered that the field studies during the forthcoming season should include the continuation of this work. This could be done very economically by reconnaissance methods, and could be combined with certain supplementary power investigations necessary in the vicinity of Lac du Bonnet on the Winnipeg river, and with land flooding questions which must be dealt with on the river this season.

There has accumulated a great deal of Dominion land survey work necessary in connection with the allocating of land required by power companies for power site purposes, and for flooding purposes, as well as some important land matters difficult of settlement between the power companies and the department. It is proposed to have these matters handled by Mr. Dunn. It would be difficult for the department to secure a better qualified and more experienced engineer for the purpose.

GENERAL.

Grand Rapids Power Site.

Following the inspection of the power reach of the Saskatchewan river in the vicinity of Grand rapids made on the ground by the writer in company with Mr. Hendry, a definite decision was reached looking to the development of the power in harmony with the navigation and drainage interests involved. As a result, an agreement has been entered into between the department and Mr. D. B. McDonnell for the construction of a pulp and paper undertaking at the upper Grand Rapids site. General layout and construction plans covering the proposed development have been submitted to and approved by the department and it is understood that active construction operations will be commenced as soon as weather conditions permit access to the site. The present plans provide for the installation of three 7,000 horse-power units with provision for the installation of three additional units when market conditions demand. The head developed will average 55 feet and the headwaters will flood out Red Rock rapids about five miles above the power site. The working plans are being developed in harmony with the requirements of navigation as laid down by the Department of Public Works.

International Joint Commission.

It is probable that the International Joint Commission will at an early date report its findings on the "Lake of the Woods Reference". This question has been before the commission since 1912. The question has involved many conflicting interests of navigation, power fisheries and the flooding of lands and property around the lake borders. The use of the lake as a storage reservoir for the regulation of the run-off has been of vital interest to this department, in view of its effect on the power reach of the Winnipeg river in Manitoba. In consequence of this, very careful studies have been made by the field officers of this branch of the conditions on the lake and of those involved in the question of discharge from the lake. The data secured in connection with these power studies have been made available to the consulting engineers of the commission and additional data secured at their request whenever desired.

At different public hearings in connection with the reference, representations have been made by this branch in the interests of the powers on the river below, emphasizing the necessity of a substantial storage range on the lake, under domestic control. It is understood that no further public hearings are at present contemplated, and it is probable that the commission will make its recommendations at an early date.

LAKE OF THE WOODS REGULATION.

Pending the adoption by the Canadian and United States Governments of such recommendations as may be made by the commission in respect to the reference, and with a view to the maintenance of better surface level conditions and the prevention, if possible, of future floods on the lake, an arrangement was made in September last between this office and the Department of Public Works of the province of Ontario whereby this branch should advise the Ontario authorities as to the operation of the Norman dam on the western outlet from the lake. This arrangement has necessitated this office and the Winnipeg office keeping in daily touch with the meteorological and run-off conditions throughout the watershed. A very complete system of securing and recording this data has been evolved, and the above offices, together with the office of the Provincial Department of Public Works, are in daily receipt of all data essential to an intelligent regulation of the lake. The Ontario authorities are advised from time to time by Mr. Hendry of the steps which, in the opinion of this branch, should be taken to forestall conditions of flood or low water. To date, this advisory co-oper-

ation in the regulation has worked out most satisfactorily and in spite of the exceptionally heavy precipitation occurring during the winter season, it is considered that the situation is well in hand to prevent the recurrence of such flood conditions as were experienced last season.

STAFF.

Upwards of thirty members of the field staff are at present on overseas military service. As a result, it has been necessary to materially limit the field investigations. That such excellent results in departmental work have been realized by the various field offices and organizations is very largely owing to the fact that the remaining members of the staff have cheerfully accepted and satisfactorily carried out the extra work devolving upon them.

No. 5.

REPORT OF THE CHIEF ENGINEER OF THE BRITISH COLUMBIA HYDROMETRIC SURVEY.

R. G. Swan, B.A.Sc., A. M. Can. Soc. C. E.

SCOPE OF WORK.

The work of collecting hydrometric data in the province of British Columbia has been carried on during 1916 under more or less adverse conditions. The absolute necessity of practising the strictest economy combined with the shortage of staff, has had the effect of confining the field of research, almost exclusively, to those streams upon which stations had already been established. By a careful planning of the staffs' field work, it was, however, found possible to maintain most of the stations established in former years. Those streams upon which sufficient data for the requirements of the British Columbia Water Rights Branch had already been collected, were discontinued, as were also those established in connection with the proposed water supply for the town of Field, the scheme having been abandoned.

As a result of the co-operation between the Dominion Lands Branch and the Water Power Branch, investigations have been made and reports submitted on the following:—

Application of the Imperial Oil Company to construct a dam and pipe-line for a water supply in connection with their refinery.

The claim of owners of lot 19, G. 2, tp. 11, E.C.M. to lot 242, G. 2, tp. 11, E.C.M.

Application of J. C. Shields to purchase under irrigation conditions, certain lands in tps. 20 and 21, range 20, west of 6th meridian.

Application of the city of Salmon Arm for the setting aside of certain lands in the drainage area of East Canoe creek, from which the city secures its water supply.

Application of A. R. G. Goodwin to purchase under irrigation conditions lands in section 28, tp. 19, range 15, west 6th meridian.

The scheme for co-operation with the Provincial Water Rights Branch, both in work and finance, inaugurated in 1914, has been continued throughout the year with marked success. Every effort has been made to assist the Water Rights Branch by establishing stations on streams where data were required in connection with their administration.

Owing to the shortage of staff, to which passing reference has already been made, it was found necessary to call the field engineers into the office to assist in the annual compilation of run-off data. This was regrettable, as at the time most of the gauging stations, particularly in the interior of the province, required almost constant attention, owing to the discharge relation being affected by ice conditions.

For the same reason it was found impossible to devote to the newly established Fort George district, the amount of attention it really required, the services of Mr. Elliott, the engineer of that district, being more urgently needed in the Nelson division.

ORGANIZATION.

The methods of collecting and compiling the data for publication in the Annual Stream Measurement Report were similar to those of previous years.

At the commencement of the year the staff consisted of the chief engineer, two division engineers, six assistant engineers, one accountant, two clerical assistants, and two stenographers.

For the first quarter of the year the organization was similar to that of 1915. In April, Mr. C. E. Richardson, the division engineer at Nelson, enlisted with the C.E.F., and Mr. H. O. Dempster the assistant engineer, resigned. Except for the temporary appointment of Mr. T. R. Patterson for the summer months, the engineers referred to were not replaced. Under the circumstances it was considered advisable to temporarily close the Nelson office. For the balance of the year the field work was directed from the Vancouver office, the routine work being placed in charge of G. K. Beeston who was formerly office engineer at Nelson, and was transferred to Vancouver.

The arrangement of the territory into districts, instituted in 1914 with a view to the economical visitation of streams, having been found quite satisfactory, no change has been made.

It is with deep regret that mention is made of the death, while on active service, of Mr. E. M. Dann and Mr. C. P. Cotton, members of this staff, whose work, of a high order, will be greatly missed by the survey.

COAST DIVISION.

The field work in the three districts of the Coast Division was in charge of Mr. C. E. Webb, B.A.Sc., and Mr. H. C. Hughes, B.Sc. Mr. Webb was in charge of the Vancouver Island District, Mr. Hughes in charge of the Lillooet District, and both engineers in charge of the Southern District at different periods.

List of Regular Gauging Stations, Southern District.

Station Number	Stream.	Location.
1000	Belknap	Tp. 6, Rge. 7, W. 7. M.
1063	Belknap	Tp. 7, Rge. 7, W. 7. M.
1001	Boulder	Tp. 3, Rge. 27, W. 6. M.
1021	Brandt	Tp. 7, Rge. 7, W. 7. M.
1023	Capilano	Near North Vancouver, Water District of Vancouver.
1004	Chilliwack	Tp. 23, E. C. M.
1005	Coquihalla	Tp. 5, Rge. 26, W. 6. M.
1066	Coquitlam	Tp. 39, W. C. M.
1062	Flume	Six miles from head of Burrard Inlet, Water District of Vancouver.
1007	Fraser	Tp. 5, Rge. 26, W. 6. M.
1064	Hixon	Tp. 6, Rge. 7, W. 7. M.
1084	Ioco No. 2	Burrard Inlet, Water District of Vancouver.
1087	Ioco No. 5	Burrard Inlet, Water District of Vancouver.
1010	Jones	Tp. 3, Rge. 27, W. 6. M.
1046	Lynn	Near North Vancouver, Water District of Vancouver.
1011	Mesliloet	Tp. 7, Rge. 6, W. 7. M.
1058	Nicolum	Tp. 4, Rge. 5, W. 6. M.
1013	Norton	Tp. 7, Rge. 7, W. 7. M.
1022	Seymour	Near North Vancouver, Water District of Vancouver.
1055	Skagit	Forty miles south from Hope, Water District of Ashcroft.
1089	South Lillooet (Alouette)	Tp. 4, Rge. 4, W. 7. W.
1056	Sumallo	Near Railway Belt Boundary, Water District of Ashcroft.
1057	Sumallo	Tp. 3, Rge. 24, W. 6. M., Water District of Ashcroft.
1020	Young	Tp. 7, Rge. 7, W. 7. M.

List of Miscellaneous Gauging Stations, Southern District.

Station Number	Stream.	Location.
1085	Ioco No. 3	Burrard Inlet, Vancouver Water District.
1086	Ioco No. 4	" " "

The streams under observation in this district in 1915 were all maintained, with the exceptions of the Chehalis and Pitt rivers, the stations on which were discontinued early in the year.

The only place on the whole reach of the Chehalis river where the services of a gauge reader could be secured, was near the mouth, while the diversion for a power development would be at the outlet of Chehalis lake. When the British Columbia Electric Railway Company discontinued their surveys they also discontinued the gauge reading on their gauge at the outlet of the lake, and as their records were not continued for a sufficient length of time to establish the relation between the two gauges, we decided to discontinue observing the gauge which we had installed near the mouth.

Owing to the fact that no one resided in the vicinity of Silver Pitt river, the cost of obtaining records was out of proportion to the importance of the stream, and it was therefore considered advisable to discontinue the station until conditions became more favourable.

A Gurley recording gauge was installed on Jones creek, one of the most important undeveloped powers close to Vancouver. The Vancouver Power Company, which is interested in the flow of this stream, co-operated in the installation of the gauge by carrying out the work in connection with the intake, well and gauge house.

The light cable carrier, as worked out by Mr. Cline, in use on streams with widths up to 150 feet, has proved a great success, and during the year carriers of an improved design have been installed on Belknap, Capilano and Lynn creeks.

List of Regular Gauging Stations, Lillooet District.

Station Number	Stream.	Location.
1065	Brandywine	Near Brew, 1 mile above mouth Water District of Vancouver.
1045	Bridge	Ten miles from Shalaith—Thirty miles above mouth Lillooet Water District.
1048	Cayuse	Near Lillooet. Above Seton Creek Lillooet Water District.
1034	Cheakamus	Near Checkye, Vancouver Water District.
1088	Cheakamus	Near Watson, Vancouver Water District.
1074	Foster Bar	23 miles south of Lillooet—Lillooet Water District.
1047	Fountain	Near Lillooet, 1 mile above mouth Lillooet Water District.
1072	Fraser	At Lillooet, Lillooet Water District.
1035	Green	Near Pemberton—above Nairn Falls, New Westminster Water District.
1050	Laluwissin	Sec. 30, Tp. 27, Rge. 17, W. 6 M.
1038	Lillooet	Near Pemberton, New Westminster Water District.
1073	Pavilion	Near Pavilion, Lillooet Water District.
1049	Seton	Near Lillooet—below Seton Lake, Lillooet Water District.
1044	Texas	14 miles below Lillooet, Lillooet Water District.

LIST OF MISCELLANEOUS GAUGING STATIONS, LILLOOET DISTRICT.

1083	Island Bar	10 miles below Lillooet, Lillooet Water District.
1043	Riley	9 miles below Lillooet, Lillooet Water District.
1075	Swartz	19 miles below Lillooet, Ashcroft Water District.

The study of stream flow data in the above district was commenced during the construction of the Pacific Great Eastern Railway between Vancouver and Lillooet, and gauge records at several stations were taken by employees of the company. Since the completion of the construction of this section of the railroad, some localities are practically uninhabited, and it therefore became very difficult to maintain these stations. Those on Soo and Sixmile rivers, which are more or less isolated have had to be discontinued during the year.

This is regrettable as both rivers, which are tributaries of Green river, are of importance, particularly Soo river, because the excellent undeveloped power site at Nairn falls, Green river, is dependent on Soo river for storage.

List of Regular Gauging Stations, Vancouver Island District.

Station Number	Stream.	Location.
1032	Big Qualicum	1½ mile above mouth, Nanaimo Water District.
1042	Campbell	At Campbell Lake, Nanaimo Water District.
1027	Chemainus	1 mile above mouth, near Chemainus, Victoria Water District.
1054	Cowichan	At Cowichan Lake, Victoria Water District.
1030	Englishmans	1½ mile above mouth, near Parksville, Nanaimo Water District.
1026	Koksilah	2 miles above mouth, near Duncan, Victoria Water District.
1031	Little Qualicum	At Cameron Lake, B.C., Nanaimo Water District.
1028	Nanaimo	6 miles above mouth, Nanaimo Water District.
1040	Oyster	1 mile above mouth, Nanaimo Water District.
1036	Puntledge	1 mile above mouth, near Courtenay, Nanaimo Water District.
1063	Puntledge	Diversion Dam, above Canadian Collieries Power Plant, Nanaimo Water District.
1025	Shawnigan	At Shawnigan Lake, Koenigs, B.C., Victoria Water District.
1051	Sproat	At Sproat Lake.
1052	Stamp	At Great Central Lake.
1053	Stamp	½ mile above Stamp Falls, Alberni Water District.
1039	Tsolum	3 miles above mouth, near Courtenay, Nanaimo Water District.

List of Miscellaneous Gauging Stations, Vancouver Island District.

Station Number	Stream.	Location.
1079	Holt	C.N.P. Ry. Bridge, near Duncans, Victoria Water District.

No changes have been effected in this district during the year.

KAMLOOPS DIVISION.

There have been no changes in the personnel of the staff of the Kamloops division during the year. The pressure of work made it necessary to hire temporary assistance from time to time as it was required.

Any stations established, or discontinued during the year are mentioned under the headings of their respective districts.

List of Regular Gauging Stations, Kamloops District.

Station Number	Stream.	Location.
2084	Barriere	Near Barriere, Kamloops Water District.
2002	Bolean	Tp. 18, Rge. 12, W. 6. M.
2004	Campbell	Tp. 19, Rge. 16, W. 6. M., Kamloops Water District.
2005	Cherry	Tp. 19, Rge. 19, W. 6. M.
2047	Clearwater	Near Raft River, Kamloops Water District.
2082	Edwards	Tp. 22, Rge. 16, W. 6. M.
2083	Edwards (Lyons Diversion)	Tp. 22, Rge. 16, W. 6. M.
2011	Essell	Tp. 17, Rge. 14, W. 6. M.
2067	Fishtrap	30 miles north of Kamloops, Kamloops Water District.
2013	Greenstone	Tp. 17, Rge. 20, W. 6. M.
2014	Guichon	Near Mamit Lake, Nicola Water District.
2019	Heffley (below Heffley Lake)	Tp. 22, Rge. 16, W. 6. M.
2018	Heffley (above diversions near mouth)	Tp. 22, Rge. 17, W. 6. M.
2020	Ingram	Tp. 17, Rge. 13, W. 6. M.
2022	Jamieson	Tp. 22, Rge. 17, W. 6. M.
2056	Little Clearwater	Near Raft River, Kamloops Water District.
2023	Louis	Tp. 23, Rge. 15, W. 6. M.
2024	Monte (above Bostocks diversion)	Tp. 19, Rge. 15, W. 6. M.
2025	Monte (below diversion to Summit L.)	Tp. 18, Rge. 14, W. 6. M.
2026	Monte (diversion to Summit Lake)	Tp. 18, Rge. 14, W. 6. M.
2069	Murtle	Near Raft River, Kamloops Water District.
2085	North Thompson	Near Barriere, Kamloops Water District.
2032	Paul	Tp. 20, Rge. 16, W. 6. M.
2055	Raft	Near Raft River, Kamloops Water District.
2078	Salmon	Tp. 18, Rge. 12, W. 6. M.
2058	Siwash	Tp. 22, Rge. 16, W. 6. M.
2091	Sullivan	Tp. 23, Rge. 16, W. 6. M.
2080	Three mile (Durand)	Tp. 20, Rge. 21, W. 6. M.
2043	Tranquille	Tp. 20, Rge. 19, W. 6. M.
2066	Whitewood	Near Barriere, Kamloops Water District.

List of Miscellaneous Gauging Stations, Kamloops District.

Station Number	Stream.	Location.
2093	Boulder	Sixty miles north of Kamloops, Kamloops Water District.
2057	Canyon	Tp. 21, Rge. 15, W. 6. M., Kamloops Water District.
2095	Fadear	Tp. 24, Rge. 15, W. 6. M., Kamloops Water District.
2096	Heffley (Anderson's Diversion)	Tp. 22, Rge. 16, W. 6. M., Kamloops Water District.
2097	Heffley (Crawshaw Diversion)	Tp. 22, Rge. 16, W. 6. M., Kamloops Water District.
2098	Lane	Tp. 22, Rge. 17, W. 6. M., Kamloops Water District.
2099	Peterson	Tp. 19, Rge. 17, W. 6. M., Kamloops Water District.
2100	Scuittoe	Tp. 18, Rge. 16, W. 6. M., Kamloops Water District.

This year the ratings were completed for Fishtrap and Greenstone creeks, and the discharges worked out for both 1915 and 1916.

On account of more stable conditions in the stream bed, it has been possible to compute daily discharges for Essell creek and Sullivan creek, and they are reported as regular stations for 1916.

Daily discharges cannot be given for Campbell creek, on account of changes in the bed of the stream. It is the intention to find a new location for the station on this stream next season.

List of Regular Gauging Stations, Okanagan District.

Station Number	Stream.	Location.
2000	Adams	Tp. 23, Rge. 12, W. 6. M.
2065	Ashnola	Near Keremeos, Princeton Water District.
2048	Boundary	At Greenwood, Grand Forks Water District.
2070	Brash	Tp. 18, Rge. 8, W. 6. M.
2050	Celesta	Tp. 26, Rge. 8, W. 6. M.
2073	Chase	Tp. 21, Rge. 13, W. 6. M.
2051	Crazy	Tp. 23, Rge. 5, W. 6. M.
2010	Eagle	Tp. 23, Rge. 6, W. 6. M.
2049	Kettle (Carson)	At Carson, Grand Forks Water District.
2092	Kettle (Cascade)	At Cascade, Grand Forks Water District.
2046	Kettle (Nicholsons Bridge)	Near Kettle Valley, Grand Forks Water District.
2045	Kettle (West Fork)	Near Westbridge, Grand Forks Water District.
2088	Okanagan	At Okanagan Falls, Fairview Water District.
2061	Seymour	Head of Seymour Arm, Shuswap Lake, Kamloops Water District.
2034	Shuswap	Tp. 18, Rge. 9, W. 6. M.
2054	Similkameen	Near Ashnola, Princeton Water District.
2063	South Similkameen	At Princeton, Princeton Water District.
2042	South Thompson	Tp. 21, Rge. 13, W. 6. M.
2062	Tulameen	At Coalmont, Princeton Water District.

List of Water-Level Stations.

Station Number	Stream.	Location.
2103	Adams Lake	Tp. 23, Rge. 12, W. 6. M., Kamloops Water District.
2087	Shuswap Lake	Tp. 21, Rge. 8, W. 6. M., Kamloops Water District.
2040	Thompson-Kamloops	Tp. 20, Rge. 17, W. 6. M., Kamloops Water District.

List of Miscellaneous Gauging Stations, Okanagan District.

Station Number	Stream.	Location.
2101	East Canoe	Tp. 20, Rge. 8, W. 6, M. Kamloops Water District.
2052	Kettle—North Fork	Grand Forks, Grand Forks Water District.
2102	Otter	Tulameen River, Princeton Water District.
2081	Twentymile	Hedley, Princeton Water District.

The ratings have been completed for Ashnola and Celesta creeks, and this year they are reported as regular gauging stations. Discharges have been computed for both 1915 and 1916.

The station on the North Fork of the Kettle river at Grand Forks proved unsatisfactory on account of the slag which is dumped into the river at the smelter. It was discontinued, and a new station established on the main river at Cascade. The new station gives the total flow of the Kettle river, including the North Fork.

Several stations in this district have been discontinued after records had been kept for a year or two, since there seemed to be an abundant supply of water, and a

more accurate idea of the stream flow was not considered necessary. Observations on the following stations were discontinued this year: Granite, Manson, Ross, Scotch, and Niskonlith.

On Twentymile creek there is a power plant which utilizes the total flow of the stream, so that actual measurements are hardly necessary. The station was very expensive and difficult to maintain, and it has been discontinued.

List of Regular Gauging Stations, Ashcroft District.

Station Number	Stream.	Location.
2001	Barnes	Tp. 20, Rge. 24, W. 6. M.
2089	Beaver	North of Nicola Lake, Nicola Water District.
2003	Bonaparte	Tp. 21, Rge. 24, W. 6. M.
2071	Cache	Tp. 21, Rge. 24, W. 6. M.
2072	Cache (diversion to Eightmile).	Tp. 21, Rge. 24, W. 6. M.
2006	Coldwater	Near Merritt, Nicola Water District.
2007	Criss	Tp. 22, Rge. 22, W. 6. M.
2008	Deadman	Tp. 22, Rge. 22, W. 6. M.
2016	Hat	Tp. 19, Rge. 26, W. 6. M.
2027	Nahatlatch (seven miles from mouth)	Tp. 12, Rge. 27, W. 6. M.
2028	Nahatlatch (outlet of Nahatlatch Lake)	Tp. 12, Rge. 27, W. 6. M.
2030	Nicola (mouth)	Tp. 17, Rge. 25, W. 6. M.
2075	Nicola (Nicola)	At Nicola, Nicola Water District.
2086	Nicola (above Nicola Lake)	East of Nicola Lake, Nicola Water District
2090	Oregon Jack	Tp. 19, Rge. 25, W. 6. M.
2036	Scottie	Tp. 23, Rge. 25, W. 6. M.
2037	Spius	Tp. 13, Rge. 23, W. 6. M.
2039	Thompson (Spence's Bridge)	Tp. 17, Rge. 25, W. 6. W.

The station on the Nicola river at Merritt was discontinued on account of the continual shifting of the stream bed, and because measurements are now being made on both branches of the stream just above Merritt.

A staff gauge was installed on the Nahatlatch river at the outlet of Nahatlatch lakes, to replace a chain gauge previously in use. With the help of the new measurements made in 1916, the rating of this station has been revised, and it has been possible to compute fairly accurate discharges for both 1915 and 1916.

At the lower station on the Nahatlatch river an auxiliary gauge was established on which readings can be taken daily. This is quite an improvement on the weekly readings taken previously. The cable at this station was raised and more securely anchored to the rock cliff above.

Measurements were made on Scottie creek at the request of the Water Rights Branch of British Columbia.

On account of the continual shifting of the channel on Spius creek, it has not been possible to compute the daily discharges this year.

NELSON DIVISION.

As previously stated, the Nelson office was closed in the early part of April, and for the balance of the year the field work was carried on under the direct supervision of the Chief Engineer.

In addition to the territory in Mr. Hughes' care in the Coast division, the Revelstoke district of the Nelson division was also placed in his charge.

SESSIONAL PAPER No. 25

List of Regular Gauging Stations, Nelson District.

Station Number	Stream.	Location.
3025	Carpenter	Sandon, New Denver Water District.
3008	Columbia	Trail, Nelson Water District.
3066	Duncan	Howser, Kaslo Water District.
3070	Fry	Kaslo, Kaslo Water District.
3031	Goat	Erickson, Nelson Water District.
3084	Inonoaklin	Edgewood, Nelson Water District.
3029	Kaslo	Kaslo, Kaslo Water District.
3014	Kootenay	Glade, Nelson Water District.
3068	Lardeau	Howser, Kaslo Water District.
3087	L. H	Silverton, New Denver Water District.
3028	Silverton (above Intake)	Silverton, New Denver Water District.
3027	Silverton (above Mill)	Silverton, New Denver Water District.
3080	Slocan	Slocan City, New Denver Water District.
3023	Wilson	Roseberry, New Denver Water District.

List of Miscellaneous Gauging Stations, Nelson District.

Station Number	Stream.	Location.
3024	Carpenter	New Denver, New Denver Water District.
3004	Columbia	Castlegar, Nelson Water District.
3088	Enterprise	Silverton, New Denver Water District.
3091	Gold	Silverton, New Denver Water District.
3018	Slocan	Crescent Valley, Nelson Water District.
3089	Spring	Trail, Nelson Water District.
3090	Vevey	Silverton, New Denver Water District.

The station on the Columbia at Castlegar was established to provide a check on the stream flow records of the Columbia at Trail and Kootenay at Glade, but these stations having been sufficiently well rated, it was decided at the first of the year to discontinue that on the Columbia at Castlegar.

The exceptionally high water on Fry creek washed out the cable and car and changed the control. It has not been possible to re-rate the station during the balance of the year. However, the gauge has been observed daily and it is hoped it will be possible to publish daily discharges, etc., in a later report.

Owing to the stations on Silverton creek above and below Hewitt mill having been affected by high water carrying out a portion of the dam, they have not been sufficiently well rated to warrant the publication of the daily discharges.

List of Regular Gauging Stations, Revelstoke District.

Station Number	Stream.	Location.
3006	Akolkolex	Near Wigwam, Revelstoke Water District.
3003	Bugaboo	Near Spillimacheen, Golden Water District.
3005	Columbia	Golden, Golden Water District.
3007	Columbia	At Revelstoke, Revelstoke Water District.
3053	Hospital	Near Golden, Golden Water District.
3009	Illecillewaet	Near Revelstoke, Revelstoke Water District.
3030	Incomappleux	Beaton, Revelstoke Water District.
3086	Incomappleux	Cambourne, Revelstoke Water District.
3011	Kicking Horse	At Golden, Golden Water District.
3012	Kicking Horse	Near Field, Golden Water District.
3013	Kicking Horse	Near No. 2 Tunnel, Golden Water District.
3015	No. 12	Wilmer, Windermere Water District.
3019	Spillimacheen	Near Spillimacheen, Golden Water District.
3020	Toby	Athalmer, Windermere Water District.

List of Miscellaneous Gauging Stations, Revelstoke District.

Station Number	Stream.	Location.
3054	Washout	Galena, Golden Water District

A number of stations in this district, for various reasons, were discontinued at the first of the year.

Field Springs, No. 1, No. 2, and No. 3, as previously stated, established in connection with the proposed water supply for the town of Field, were discontinued owing to the project being abandoned.

On account of the difficulty in rating North and South Vermilion creeks, caused by the shifting nature of the river beds, the establishment of permanent controls is under consideration.

The station on the Blaeberry river was discontinued; having been kept up for several years it was considered that sufficient data had been accumulated for any use to which the stream may be put.

The high water affected the rating of Incomappleux and No. 2 rivers, and the new ratings are not sufficiently well defined to compute the daily discharges.

List of Regular Gauging Stations, Cranbrook District.

Station Number	Stream.	Location.
3042	Big Sand	Jaffray, Fernie Water District.
3039	Bull	Bull River, Fernie Water District.
3038	Cherry	Wasa, Cranbrook Water District.
3048	Elk	Elko, Fernie Water District.
3047	Gold	Newgate, Cranbrook Water District.
3041	Kootenay	Wardner, Cranbrook Water District.
3043	Little Sand	Jaffray, Fernie Water District.
3037	Mark	Marysville, Cranbrook Water District.
3056	Moyie	Kingsgate, Cranbrook Water District.
3049	Rock	Elko, Fernie Water District.
3050	St. Mary's	Wycliffe, Cranbrook Water District.

List of Miscellaneous Gauging Stations, Cranbrook District.

Station Number	Stream.	Location.
3045	Linklater	Newgate, Cranbrook Water District.
3046	Phillips	Roosville, Fernie Water District.

Previous to 1916 the station on Rock creek had been maintained as a regular gauging station, but this year it was impossible to obtain a gauge reader.

The exceptional high water which occurred in June affected the control on Bull river, and it was not found possible to re-rate the station during the balance of the year. Daily gauge records have been secured and it is hoped that it will be possible to publish daily discharges in a later report.

The extreme high water in the Kootenays, which is shown by reliable information to have been the highest since 1894, washed out several of our gauges, and consequently some of our records are broken for the short period, until the gauges were replaced.

FORT GEORGE DISTRICT.

Owing to the necessity of transferring Mr. Elliott from the Fort George district to the Nelson division, to which reference has already been made, we were not able to devote the amount of attention required to thoroughly rate the Fort George stations.

List of Regular Gauging Stations.

Station Number	Stream.	Location.
4004	Bulkley	Hazelton, Hazelton Water District.
4003	Bulkley	Hubert, Hazelton Water District.
4002	Doré	McBride, Fort George Water District.
4007	Fraser	Ft. George, Fort George Water District.
4000	Nechako	Ft. Fraser, Fort Fraser Water District.
4006	Nechako	Vanderhoof, Fort Fraser Water District.
4005	Skeena	Hazelton, Hazelton Water District.

OFFICE WORK.

The office system which is co-related to the work of the field engineers whom it is designed to assist, has reached a degree of efficiency worthy of note.

The work of checking and filling data received from the field is kept up to date, and the records are filed in a manner making them easy of access.

The data are received from two sources; gauge observers and field engineers. The gauge observers forward their observations weekly by means of postal cards. These observations are at once entered on the discharge sheets and are then filed under the name of the stream to which they refer. The field engineers make weekly returns while in the field. These returns consist of diaries showing the work accomplished and the expenses incurred, and all field notes duly computed. The diaries, after perusal by the chief engineer, are passed on to the accountant, who compiles the costs data from the information contained in them, and credits each engineer with his expenses, forwarding a fresh supply of funds, if necessary. The computed field notes are given

to the office engineers who check them and, in the case of meter measurements, having plotted the results on the stream rating curves, file them under the head of the stream to which they belong. The chief engineer is kept in touch with all results and also with any fluctuation in water stages which is likely to make desirable an early visit from an engineer.

With regard to the care of equipment the system in use has proved its efficiency. When leaving for the field the engineer's equipment is listed, and the list checked and signed by the engineer, who assures himself that everything is in working order. On his return the equipment is compared with the list, and any repairs which may be required are immediately carried out. In evidence of the efficiency of this system it may be noted that during the year under review no losses of equipment have occurred.

CONCLUSION.

In reviewing the work of the past year in the light of the previously indicated difficulties under which it was accomplished, I find much reason for satisfaction with the results achieved. This success is largely due to the willingness with which extra work was undertaken by the staff and the energy with which it was performed.

No. 6.

REPORT OF THE CHIEF ENGINEER OF THE MANITOBA HYDROMETRIC SURVEY.

M. C. Hendry, B.A.Sc., A.M. Can. Soc. C. E.

SCOPE OF WORK.

The territory covered by the survey comprises the southern half of the province of Manitoba and a portion of the province of Ontario tributary to the Winnipeg river.

Investigation in the northern part of Manitoba has been only of a reconnaissance nature, and has been confined to those major streams which are comparatively easy of access.

It is recognized that great importance attaches to the early inception of hydrometric work in the outlying districts, for as a rule the need of authentic records of stream flow, particularly for power purposes, generally precedes the opening up of the country, as in the case of development for the manufacture of pulp and for the transmission of power to a distance. Two things have militated against this expansion of the work, first, the lack of transportation facilities and second and more important, the reduction in staff owing to enlistments and war conditions.

Instead of expanding the work the tendency has been to curtail it, and the main effort of the survey has been directed toward maintaining operations at the more importants points from the standpoint of immediate necessity of records. During the past year no power investigations were carried on.

ORGANIZATION.

In the reports already published the organization of the survey has been discussed. The work has been handled directly from the main office in Winnipeg, with the exception of that carried on around the Lake of the Woods outlets, where a local staff has been maintained. In consequence, rearrangement of the personnel owing to enlistments has not been difficult, though curtailment of the work has been rendered necessary.

Early in the summer of 1916, the Winnipeg Electric Railway Company undertook some alterations to its plant on the Pinawa channel. As in the case of all construction carried on under approval of the department, it was necessary to detail an inspecting engineer for the work. A member of the Hydrometric Survey staff was selected for this purpose.

STAFF.

During the year 1916-17 the staff was further reduced through the enlistment of two of the members, bringing the total number from this office now engaged in military duties up to fifteen. There have been practically no replacements.

During the year the names of three of these men appeared in the casualty lists. Lieut. W. H. Bartlett was the first of the staff to give his life for his country. Sapper Alexander Pirie was wounded but has since rejoined his unit, and Sergeant P. J. Barry of the P.P.C.L.I., one of the original members of that battalion, has been in hospital as a result of his work at the front. Of the remainder of the staff who are engaged in military duties, all are either in France or England.

At the Lake of the Woods outlets the work had been handled by two members of the staff. However, the exceptional conditions that were experienced at that point

during the spring and early summer threw a very heavy burden on these men, so that it was necessary to increase this force. Mr. M. S. Madden was placed in charge of the work with three and afterwards four assistants, in order that the physical data required in connection with the Lake of the Woods reference before the International Joint Commission might be secured.

It was also necesssary to have a man devote his whole attention to that section of the Winnipeg river between Point du Bois and the diversion dams at the intake to the Pinawa channel. Mr. Patterson was placed in charge of this work and was on the ground from June 1 until November 1. Other sections of the Winnipeg river were under observation by the writer assisted by Mr. Ireland. Valuable aid was also rendered by Mr. A. M. Beale, a member of the Ottawa office, who was carrying on certain work in the vicinity.

During the summer months, Mr. C. O. Allen made a trip to Manitou rapids, on the Nelson river, and to the head of Grand rapids, on the Saskatchewan river, and secured hydrometric data at each point covering exceptional high-water conditions. In February and March of 1917 the rivers entering lake Winnipeg from the east and the Saskatchewan river at Grand rapids were also visited by the same officer and stream flow data gathered.

Except during the period of spring run-off, conditions throughout the rest of the province were under the observation of Mr. R. C. Robinson.

The alterations to the Winnipeg Electric Railway Company's plant required the attention of Mr. W. J. Ireland from about July 15 to the end of November 1916, and during February and part of March 1917.

OFFICE WORK.

A great deal of time has been devoted to the office preparation of the field data secured at the Lake of the Woods outlets, necessary to the power and storage investigations of the Winnipeg river, also to the consideration of the Lake of the Woods reference by the International Joint Commission and by all other interests affected thereby.

During seasons when little field work could be carried on data were prepared for the Annual Stream Measurement report. These annual reports contain the data gathered during the calendar year, and include the results of all meterings made at each station on the streams investigated; the observed daily gauge heights; the estimated mean daily discharge; the maximum, minimum and mean monthly discharge, and the total monthly and yearly run-off for the various stations maintained.

HYDROMETRIC WORK.

During the year 1916-17 the following regular metering stations have been maintained:—

REGULAR METERING STATIONS.

File No.	Stream.	Location.
A.1a	Assiniboine river	Brandon.
A.1c	" "	Headingly.
A.1d	" "	Millwood.
B.3a	Brokenhead "	Sinnot.
B.4a	Birdtail creek	Birtle.
L.1a	Lake of the Woods	Kenora Power House (Headrace).
L.1b	" " "	North Tunnel Island, Keewatin River Bridge.
L.1c	" " "	Norman Traffic Bridge, Norman Dam Headrace.
L.1e	" " "	Old K. L. & M. Co.
L.1f	" " "	Mill "A."
L.1g	" " "	Mill "C."
L.3f	Minnedosa river	Beilby's Bridge.
L.3h	" " "	Indian Bridge.
L.3m	" " "	Middleton Bridge.
M.1a	Manigotagan River	Above Wood Falls.
M.4d	Mossy "	Below Fork River.
N.1e	Nelson "	4 miles above Shell Rapids.
O.1a	Ochre "	Ochre River.
R.1a	Rat "	Otterburne.
R.4a	Red "	Emerson.
R.5b	Roseau "	Baskerville's Farm.
R.5e	" "	Stuartburn.
R.6a	Red Deer "	Hudson Bay Jct.
R.7b	Rolling "	C.N.R. Crossing.
S.1a	Saskatchewan "	Head of Grand Rapids.
S.1d	" "	Pas.
S.3a	Shell "	Asessippi.
S.4a	Souris "	Wawanesa.
S.4b	" "	Melita.
S.6a	Swan "	Swan River.
V.1a	Valley "	Valley River.
W.1a	Whitemouth .	Whitemouth.
W.6d	Winnipeg "	Slave Falls.
W.6w	" "	Whitedog Falls
W.10a	Whirlpool "	Danvers.
W.11a	Woody "	Bowsman.

In addition meterings have been obtained at the following stations, but owing to the fact that daily discharges have not been computed, they are listed under the heading of Miscellaneous Metering Stations;—

MISCELLANEOUS METERING STATIONS.

File No.	Stream.	Location.
B.1a	Berens river	8½ miles from mouth.
B.1b	" "	Little Grand Rapids.
B.5a	Bloodvein river	8 miles above mouth.
B.6a	Boyne "	Carman.
C.3b	Clear creek	Outlet Clear Lake.
L.1j	Lake of the Woods	C.P.R. Culvert.
L.2b	La Salle river	Sanford.
L.3c	Minnedosa river	Minnedosa Power House (Headrace.)
M.3b	Morris river	Rosenort.
P.1c	Pembina river	Near Manitou.
P.2b	Pinawa channel	Below Control Dam.
P.2j	Winnipeg river	Below Sharkey's Dam.
P.4a	Pigeon river	Above First Rapids.
R.5d	Roseau "	Below Dominion City.
W.6ab	Winnipeg river	Throat Rapids.
W.6bc	" "	Intake, Point du Bois.
W.8a	Whitemud "	Holmfield.

At a number of other points no measurements of the discharge were obtained but records of daily gauge height were secured. These were gathered more especially in connection with certain studies being made on the Lake of the Woods outlets, Winnipeg river, and Nelson river. Gauge records were also secured for the various lakes in the area covered by the survey. The places where such records were secured are listed below:—

GAUGING STATIONS.

File No.	Stream.	Location.
B.8a	Boggy lake	At Outlet Whirlpool river.
F.1a	Fairford river	Fairford.
F.3a	Family lake	Little Grand Rapids.
L.1a	Lake of the Woods	Kenora Power House (Tailrace).
L.1d	" "	Norman Dam (Tailrace).
L.1m	" "	Ontario D.P.W. lake gauge (M.H.S).
L.1n	" "	Keewatin River gauge Mill "A."
L.1p	" "	Kenora Automatic gauge.
L.3c	Minnedosa	Minnedosa Power House (Tailrace.)
L.4a	Lac Seul	Hudson's Bay Co. Post.
M.1a	Manigotagan river	Below Wood Falls.
M.2c	Lake Manitoba	Delta.
N.1a	Nelson river	Norway House.
N.1f	" "	McMillan's Landing.
N.1h	" "	Manitou Bridge Crossing.
N.1j	" "	Kettle Rapids.
N.1k	" "	Kettle Bridge Crossing.
C.3a	Otter creek	Scandinavia.
P.1b	Pembina river	Killarney.
P.2a	Pinawa channel	Above Control Dam.
P.2b	" "	Automatic gauge below Control Dam.
P.2c	" "	W. E. Ry. Forebay and Tailrace.
P.2h	" "	Intake.
P.2j	" "	Above Sharkey's Dam.
P.2k	" "	Above Diversion Dam (M.H.S.)
P.2l	" "	Above Diversion Dam (W. E. Ry.)
P.2m	" "	Below Diversion Dam (W. E. Ry.)
R.4c	Red river	St. Agathe.
R.4d	"	Redwood Bridge (Wpg.)
R.4e	"	Morris.
R.4f	"	Elm Park Bridge (Wpg.)
S.2a	Seine river	Ste. Anne des Chenes.
W.4a	Lake Winnipegosis	Winnipegosis.
W.5a	Lake Winnipeg	Winnipeg Beach.
W.6a	Winnipeg river	Minaki.
W.6b	" "	Tailrace, Point du Bois.
W.6ba	" "	Above Intake, Point du Bois.
W.6bb	" "	Above Screens, Point du Bois.
W.6d	" "	Above Slave Falls.
W.6d	" "	Below " "
W.6ae	" "	Foot of 2nd McArthur.
W.6af	" "	Foot Little du Bonnet.
W.6f	" "	Foot of Seven Sisters.
W.6g	" "	Winnipeg City Tramway Bridge.
W.6h	" "	Foot 1st McArthur Falls.
W.6j	" "	Head of Grand du Bonnet.
W.6k	" "	Head of Little du Bonnet.
W.6l	" "	Head Whitemud Falls.
W.6m	" "	Head of Silver Falls.
W.6n	" "	Foot of Silver Falls.
W.6o	" "	Head of Pine Falls.
W.6p	" "	Foot of Pine Falls.
W.6q	" "	Fort Alexander.
W.6r	" "	Above Seven Sisters.
W.6s	" "	Between 1st and 2nd Falls, Seven Sisters.
W.6t	" "	Between 2nd and 3rd Falls, Seven Sisters.
W.6u	" "	Foot of 3rd Falls, Seven Sisters.
W.6v	" "	Foot of 4th Falls, Seven Sisters.
W.6z	" "	Above eight-foot Falls.
W.6z	" "	Below eight-foot Falls.
W.12a	Wolf lake	Elphinstone.

PRECIPITATION.

The winter of 1915-16 was one of exceptional precipitation, a very heavy snowfall being recorded throughout the district. For instance, the snowfall recorded at the meteorological station in Winnipeg exceeded that observed during any winter season since the station was established, the total fall being 85·8 inches. The fall rains of 1915 were also heavy in many districts; as an example it may be stated that in the upper part of the Winnipeg River drainage basin, the precipitation for October and November, which was nearly all in the form of rain, was practically double the mean for the period 1885-1915.

SPRING FLOODS.

As a result of the heavy precipitation of the winter and following spring, a very heavy run-off was encountered. The Red river was the first upon which the spring freshet occurred. At Emerson the first evidence of the spring flow was noted on March 27; from that date the river rose steadily and rapidly until April 24, when the peak of the flood passed. During that time the river rose 35·5 feet, reaching the highest stage recorded since the inception of this survey, and one that has been exceeded on only two known occasions. The peak discharge at Emerson was 46,200 c.f.s. While some flooding occurred, no serious damage was sustained in that vicinity.

At Winnipeg the situation was more serious; the flood on the Red at this point crested at practically the same time as that on the Assiniboine river; as a result the river rose practically 25 feet above its winter level, the estimated discharge below the mouth of the Assiniboine being 73,000 c.f.s. In consequence, a great deal of flooding occurred in the lower parts of Winnipeg and St. Boniface. At different points along the rivers of the province flooding occurred but the above named places on the Red and Assiniboine rivers were the chief sufferers.

In the drainage basin of the Winnipeg river, particularly in that part lying above the outlet from Lake of the Woods, flooding occurred. Namakan, Rainy, and Lake of the Woods reached higher levels than any previously recorded. Lac Seul at the head of the English river, the main tributary of the Winnipeg, also reached a very high stage; as a result the discharge of the Winnipeg was abnormally high, exceeding all previously recorded stages.

Other rivers on which exceptionally high discharge was noted were the Saskatchewan and Nelson rivers.

The efforts of the survey were directed towards gathering as full records of the high discharge as possible. Owing to the critical condition that obtained in the Lake of the Woods district and the fact that, in addition to securing records for power and storage studies, the survey has been supplying the International Joint Commission with data relative to lake levels and discharge from the various outlets, it was necessary to maintain a full organization at that point for several months until conditions returned to normal. The data gathered were prepared and copies forwarded to the commission as rapidly as possible; at times this required the attention of the whole office staff.

On the Winnipeg river, water levels were secured at numerous points in addition to the observations made at the various gauging stations. The regular metering stations were also operated and a large amount of data was obtained covering the high stages.

The regimen of the Saskatchewan river was closely followed. While it was not possible to obtain as full data as in the case of the Winnipeg, observations of the discharge during the higher stages were made both at Pas and the head of Grand rapids.

SPECIAL WORK.

Hydrometric.—As a consequence of the high stages on the various rivers tributary to lake Winnipeg, a high stage obtained on that lake and as a result a heavy discharge occurred on the Nelson river.

In the past it has been impossible to obtain continuous records of discharge on the Nelson river, but an endeavour has been made to secure records of the extremes. The stage of lake Winnipeg was therefore carefully watched and as soon as it appeared to approach the maximum, one of the staff was sent down the Nelson to Manitou rapids and discharge measurements were secured. These indicate a higher rate of discharge than any previously recorded, though it is not certain that the maximum for the season was secured.

A special trip was also made to Grand rapids near the mouth of the Saskatchewan at the head of which fall a metering station has been maintained. The records obtained indicate a discharge which very nearly equalled the maximum of 1915.

In January 1917 arrangements were completed to send one of the engineers on a metering trip covering all of the rivers that enter lake Winnipeg from the east. A start was made from Fisher river, the total distance from that point being covered by dog team, and the following rivers were visited: Manigotagan, Bloodvein, Pigeon, and Berens on the east, and Saskatchewan on the west. The rivers were all metered at one point at least, and, in the case of the Berens, meterings were also obtained above Family lake. An idea of the difficulties of carrying out the work under the rigorous winter conditions met with, may be realized when it is considered that 630 miles were covered in twenty-one days, or an average of 30 miles per day, regardless of the necessity of breaking trail the greater part of the time.

Construction.—During the summer of 1916 the Winnipeg Electric Railway Company undertook certain alterations and improvements to the Company's plant on the Pinawa channel. These alterations were approved by the department and Mr. W. J. Ireland, a member of this staff, was appointed inspecting engineer on the work, following the general policy of the department. The proposed changes in the plant were as follows:—

1. To increase the effective head on the plant by raising the headworks.
2. To increase the winter flow down the Pinawa channel by repairs and improvements to the diversion dams at the head of the Pinawa channel.

The changes and improvements were proposed with a view to increasing the output of the plant especially during the winter months.

Active work on the alterations to the plant itself began in July and was carried on until the freeze-up occurred in November. The raising of the forebay walls and the placing of the piers and deck on the old spillway were completed. The extension to the spillway and the large sluiceways and gates are still incompleted.

During February and March a certain amount of rock-fill was placed at the small diversion dam, known as Sharkey's dam.

The progress of the work has been reported on from time to time by Mr. Ireland and these reports are now on file in Ottawa.

CONCLUSION.

The past year has been one in which exceptional conditions have been encountered. At a time when the staff was greatly reduced, extreme high water was observed on practically every river throughout the district covered by the survey. An exceptional opportunity was offered to obtain data relative to such conditions, and in one particular part of the territory it was imperative that the results of observations made should at once be made available to interested parties. That the situation under these conditions was met and successfully coped with, speaks volumes for the loyalty and hearty co-operation of every individual member of the staff.

No. 7.

REPORT OF THE CHIEF ENGINEER OF THE ALBERTA AND SASKATCHEWAN POWER SURVEY.

C. H. Attwood, O.L.S., A.M. Can Soc. C.E.

The field work consisted of:—

(1) The establishment of permanent bench-marks at the power sites on the Bow river.

(2) Investigation of the power possibilities of Pine creek, in section 15, township 65, range 21, west of the 4th meridian.

(3) Investigation of the power possibilities of Scoop rapids on the Sturgeon-weir river in northern Saskatchewan.

(4) A reconnaissance survey of the power possibilities of the Churchill river at Kettle falls and Bloodstone falls in Saskatchewan and Manitoba.

(5) A power survey of Crowsnest falls on the Crowsnest river about two miles west of Lundbreck, Alberta.

(6) An inspection of the power possibilities of Frog creek in fractional section 17, township 56, range 3, west of the 4th meridian.

In July last, permanent bench-marks were established at the various power sites along the Bow river in order that datum elevation established at these power sites, by previous surveys, could easily be re-established in the event of future developments. These bench-marks consisted of a brass cap screwed on to an iron lag bolt. The bolt was placed in a hole drilled in the rock, and the hole filled with molten lead. The cap was then screwed down tight and the top of the bolt, which was allowed to protrude slightly above the cap was spread and burred to prevent removal. These bench-marks were placed at the Minnewanka dam, Bow falls, Kananaskis falls, and at the Bow Fort, Mission, Ghost and Radnor power sites as follows:—

PERMANENT BENCH-MARKS.

B. M.	Elevation.	Location.
.....	4480 97	Top of new concrete sluiceway from fishery pond—Banff.
2	4743·76	Easterly end of the deck of Minnewanka storage dam
.....	4161·70	On southeasterly end of deck of Kananaskis dam—Calgary Power Co.
6	4017·64	On rock ledge, south shore Bow river at Bow Fort power site—S. 13° W. (magnetically) 76·8 feet from old B.M. No. 6.
52	3870·03	On rock, north shore Bow river at Mission power site—N. 10° E. (magnetically) 4·81 feet from old B.M. No. 52.
62	3811·21	On rock, north shore Bow river, east shore at mouth Ghost river, at Ghost power site—S. 47° E. (magnetically) 23·3 feet from old B.M No. 62.
4	3767·13	Top rock bank, north shore Bow river at Radnor power site.

(2) *Pine Creek.*—Following an application for the right to develop a small water-power on Pine creek, in section 15, township 65, range 21, west of the 4th meridian, an investigation of the power possibilities of the creek was made on August 14.

There are no discharge records of this stream available, and at the time of the inspection less than one second-foot of water was flowing in the creek. We are informed by the inhabitants that the creek was then at normal stage, and the applicant was advised that to proceed with a power development would be a waste of money.

(3) *Sturgeon-weir river.*—A power survey was made of Scoqp rapids, on the Sturgeon-weir river, to ascertain the possibility of developing sufficient power to supply the mining country lying to the north and east of Beaver lake.

The Sturgeon-weir river drains that large system of waterways lying in Northern Saskatchewan bounded by latitudes 54° 30′ and 55° 30′ and longitudes 102° and 103°, including Deschambault, Wood, Pelican, and Mirond lakes, and empties into Beaver lake, which lies about 90 miles northwest of Pas, Manitoba. The river, from Mirond lake to Beaver lake, is approximately fifty miles in length, with Scoop rapids located about midway between these two lakes.

Above Scoop rapids the river has a drainage area of approximately 5,678 square miles. At Scoop rapids there is a drop of 6 feet, and a head of 12 feet could easily be obtained without flooding much land. The river banks above the rapids are low and the left bank is low, flat, and heavily wooded for a long distance back from the river, At the rapids the river falls over a granite ledge and is only 85 feet wide. The right bank is solid granite rising to a height of 40 feet above water level, while the left bank is clay overlying the granite formation and rising to a height of 17 feet above water level at the crest of the rapids.

The best power site on the Sturgeon-weir river is at Birch rapids, situate about 10 miles above Scoop rapids, where a head of 20 or 30 feet could be obtained and above which lies a fairly large lake that could be utilized for pondage.

The only discharge measurement available is that secured by the writer on August 29 last, when the flow recorded was 2,488 second-feet. Without further discharge records it is impossible to estimate the amount of power available. There are several large lakes in the drainage area that could be easily and economically converted into storage reservoirs. It is also possible, at a very small expenditure, to divert the flood waters of the Churchill river into this drainage basin at Frog portage for the purpose of filling these reservoirs.

Extensive investigations and surveys will be necessary before the power possibilities of the stream can be even approximately estimated. These investigations would not be warranted until a market for power is assured and the requirements of such a market known.

(4) Churchill River.—A power survey was made on the Churchill river at Kettle falls in northern Saskatchewan and at Bloodstone falls in northern Manitoba.

The Churchill river basin comprises the watershed lying immediately northward of the watershed of the Saskatchewan and Nelson rivers, and drains into Hudson bay. The total area of the basin is approximately 114,150 square miles, the axis being practically east and west, extending westward to the height of land dividing it from the Athabaska. Innumerable lakes of varying size occur throughout the whole basin and the river itself to within 80 miles of its mouth can be described as a chain of lakes linked up with short stretches in which rapids and falls occur. For the last 80 miles, the Churchill is a wide stream comparatively free from formidable rapids.

The Reindeer river which drains Reindeer lake is the largest tributary of the Churchill and joins the latter about 60 miles west of the Manitoba boundary.

Kettle Falls.—Kettle falls, on the Churchill river, is situated about 5 miles above the confluence of the Reindeer and Churchill rivers. At Kettle falls the river flows over a granite ledge with a total drop of 15 feet. At this site rock foundation is available on both banks and in the river bed, and a 30-foot head could easily be obtained with a dam about 1,000 feet in length. Above the site is a large lake-like expanse of river with an area of approximately 30 square miles providing a storage reservoir with a capacity, in the top 5 feet, of approximately 100,000 acre-feet, which can be utilized as pondage for regulation purposes.

In the event of such a development it will be necessary to build, at Frog portage, an embankment about 10 feet high and between one-quarter and one-half mile in length, to prevent the Churchill waters flowing across Frog portage into the Sturgeon-weir watershed

On September 5 last the discharge of the Churchill river at Kettle falls was in the neighbourhood of 30,000 second-feet.

Bloodstone Falls.—Bloodstone falls is situated at the lower end of Sisipuk lake in northern Manitoba, approximately 17 miles east of the Saskatchewan boundary.

At Bloodstone falls, both banks and the river bed are composed of red granite, the rock on the left bank being covered with a deep layer of sandy loam and timbered with poplar and some spruce. The right bank is a high rock ridge which extends some distance above and below the falls. At the falls there is a 10-foot natural drop, while an additional 10 or 12 feet could be easily obtained with a dam 650 feet in length. Above the dam a storage reservoir between 80 and 90 square miles in area with a capacity, in the top 5 feet, of approximately 275,000 acre feet, would be available for pondage and regulation purposes.

The discharge recorded in September last at Bloodstone falls was about 50,000 second-feet.

Island Falls.—At Island Falls, situated on the Churchill river approximately 10 miles due west of the Manitoba boundary, there is a natural drop of 18 feet, while a head of 25 feet can be developed. At this site the river is divided into two channels by a large island, the larger channel being on the left. A rock ledge extends across the river, but on both banks the rock is covered with a deep layer of sandy loam and is timbered with small aspen and some small spruce.

The Churchill river throughout its entire length provides numerous power and storage sites, and will, at some future date, warrant very careful investigation. At the present time it is too far from industrial centres to be considered as a source of power, though, should the mining industry of northern Manitoba and Saskatchewan develop successfully an extensive power development might be warranted.

(5) Crowsnest River.—Following an application for the right to develop water-power on the Crowsnest river at Crowsnet falls to operate a flour mill, a power survey was made of the site, which is situated in the SE. ¼, section 28, township 7, range 2, west of the 5th meridian.

Following an application for the right to develop water-power on the Crowsnest river at Crowsnest falls to operate a flour mill, a power survey was made of the site, which is situated in the SE. ¼, section 28, township 7, range 2, west of the 5th meridian.

The Crowsnest river is one of the chief tributaries of the Oldman river. It rises in the eastern slope of the Rocky mountains, and its tributaries have their source in the mountains and foothills. The river flows easterly, joining the Oldman river in section 34, township 7, range 1, west of the 5th meridian, and has a drainage area of approximately 270 square miles.

At Crowsnest falls the river flows over a limestone ledge with a direct drop of 32 feet. Commencing at the falls and extending downstream for a distance of 400 feet, both banks are formed by sheer limestone cliffs forming a canyon 40 feet deep. From the crest of the falls and proceeding upstream the banks are low, rising gradually to the edge of the river valley at varying distances back from the river. The Canadian Pacific Railway, Crowsnest branch, crosses the river at a point approximately 600 feet above the falls on a single-span steel bridge with concrete abutments. Above the bridge, in a distance of 600 feet, the river has a fall of 4 feet, and from the bridge down to the crest of the falls the river drops another 8 feet. At the head of the falls outcrops of limestone were observed on both banks, as well as across the river bed; thus good foundations for a dam are available.

The site is one that lends itself to easy development, and a head of 46 feet can be developed without conflicting to any great extent with the existing interests. The discharge records show the minimum flow to be 46 second-feet and that in nine years

the average minimum flow was 60 second-feet. With a flow of 60 second-feet and a head of 46 feet 250 horse-power can be developed, sufficient to operate a fully equipped flour mill of 200 barrels of flour per day capacity. For possibly nine months of the year 400 horse-power can be developed.

(6) Frog Creek.—The question of developing a small water-power for domestic purposes on Frog creek in fractional section 17, township 56, range 3, west of the 4th meridian, was again raised with this department, and on October 20 last the writer secured a metering of the creek at the site. A discharge of 63 second-feet was recorded. In October 1914 a measurement was secured on Frog creek and at that time a discharge of only 0·2 second-foot was recorded.

In explaining the variation between the two measurements the applicant claims that the low flow recorded in 1914 was caused by the outlet of Frog lake being choked and silted up by sand and lake wash, and that the exceptionally large rainfall in that part of the country last year filled the lake and the high water scoured and cleaned out the outlet of the lake so that normal conditions are again likely to prevail on Frog creek. In view of the uncertainty of stream flow conditions, the applicant was advised to wait until additional discharge data has been secured before proceeding with the proposed development. An effort is now being made to secure further data relating to the stream flow.

No. 8.

REPORT ON THE WORK CARRIED ON BY THE DOMINION WATER POWER BRANCH IN CO-OPERATION WITH THE NOVA SCOTIA WATER POWER COMMISSION.

K. H. Smith, *Resident Engineer.*

SCOPE OF WORK.

In the summary report of this work for the year ending March 31, 1916 a brief sketch was given of water-power legislation in Nova Scotia, events leading to the appointment of the Nova Scotia Water Power Commission and to the co-operative arrangements made between the Dominion Water Power Branch of the Department of the Interior and the commission. The work of the year just ended has been entirely such work as is incident to the purposes and aims set out therein and involves a complete hydrometric survey of the province of Nova Scotia as well as power surveys and investigations in detail of all the more important rivers of the province.

PRECIPITATION AND EVAPORATION STATIONS.

All available precipitation data from existing meteorological stations in Nova Scotia have been co-ordinated and in co-operation with the Director of the Canadian Meteolological Service, Sir Frederic Stupart, several additional meteorological stations have been established. Evaporation stations have been established at Collegeville (Lochaber), Antigonish County, and Kedgemakooge, Annapolis County, where records of evaporation from free water surfaces are being obtained during the open water season.

HYDROMETRIC WORK.

Regular stream flow records were obtained during the year at the points listed hereunder:—

REGULAR STREAM MEASUREMENT STATIONS.

Number.	Stream.	Location.
E.o.2	Archibald Brook	Stillwater, Guysborough County.
D.b.2	Bear River, East branch	Bear River above head of tide.
D.p.1	East River Pictou, East branch	Eureka.
D.p.2	East River Pictou, West branch	Eureka.
E.m.1	East River, Sheet Harbour	Malay Falls.
D.g.2	Fall River	Near Waverley.
D.d.1	Gaspereau River	Martin's Bridge.
E.g.1	Gold River	Highway crossing near Chester Basin.
E.h.2	Indian River	Halifax and Southwestern Railway crossing.
E.f.1	Lahave River	Bruhm's Bridge, West Northfield.
E.f.3	Lahave River	Morgan's Falls, New Germany.
D.c.1	Lequille River	Annapolis Electric Light plant, Lequille.
E.n.1	Liscomb River	Hydro Electric plant, Liscomb Falls.
E.d.1	Liverpool River	Indian Gardens.
F.b.1	Margaree River	Frizzleton, C.B.
E.e.1	Medway River	Charleston.
E.k.1	Musquodoboit River	Crawford's Falls.
D.c.2	Nictaux River	Nictaux Falls.
E.h.1	Northeast River	Halifax and Southwestern Railway crossing.
D.c.3	Paradise River	At Woodworth's near Paradise.
D.n.1	Philip River	Oxford Electric Light plant.
E.c.1	Roseway River	Lower Ohio.
E.j.1	Sackville River	Bedford.
D.b.1	Sissiboo River	Near Bate's Rock, head of pond from lower pulp mill.
D.g.1	Stewiacke River	Upper Stewiacke.
D.e.1	St. Croix River	Hartville.
E.o.1	St. Mary River	Stillwater, Guysborough County.
E.a.1	Tusket River	West Gavelton.

In addition, twenty-five miscellaneous measurements were made at twelve different places.

POWER INVESTIGATIONS.

Power surveys and investigations have been carried out on the following streams: Bloody creek, Dartmouth lakes, East river Sheet harbour, Fall river, Gaspereau river, Gold river, Indian and Northeast rivers, Kearney lakes, Lequille river, Liscomb river, Paradise river, Pennant river, Sackville river, West river Sheet harbour.

This work has involved a profile survey of the power sections of all these rivers with the exception of the Gaspereau, Indian and Northeast rivers, on which surveys made by private parties were available. In every case a great deal of reconnaissance work throughout the drainage basins was necessary including surveys at the outlets of all the more important storage basins. In the case of the Lequille and Paradise rivers, extensive surveys of all the storage basins were necessary. Some storage investigations remain to be carried out in connection with East river Sheet harbour.

REPORT TO THE NOVA SCOTIA WATER POWER COMMISSION.

A report was prepared for the Nova Scotia Water Power Commission covering in detail the entire hydrometric and water power investigations in Nova Scotia up to September 30, 1916. This report covers over 200 pages of printed matter besides the necessary illustrations and plans. It gives all hydrometric, precipitation and evaporation data collected to that date as well as detailed power reports on all the rivers

listed above with the exception of Liscomb river, East river Sheet harbour and West river Sheet harbour.

Due to lack of sufficient hydrometric data, the estimates of power given for the various rivers covered in this report are necessarily of a preliminary nature. A summary of the power estimates is given hereunder.

POWER ESTIMATES at Certain Sites in Nova Scotia.

Power site.	Mean effective head in feet.	Estimated continuous turbine horse-power at 85 per cent efficiency and regulated flow.
Bloody creek	400	309
Dartmouth lakes:		
Foot of Sullivan pond	56	108
Head of Sullivan pond	11	21
Fort Wallis locks	30	29
Fall river:		
Foot of Miller lake	95	367
Head of Miller lake	60	197
Gasperau river	440	7,437
Gold river:		
Salmon falls	62	647
Lake Holden branch	140	406
Burned Potato falls	48	640
Long Run	40	406
Mosher falls	68	985
Indian and Northeast rivers combined at tidewater on the Indian river	93	1,976
Indian river, at Little Indian lake	85	1,232
Northeast river, at Little Indian lake	148	1,001
Kearney lakes:		
At tidewater	70	169
Head of Papermill lake	65	144
Lequille river	360	2,608
Paradise river	500	2,898
Pennant river:		
At tidewater	45	196
Head of Grand lake	28	68
Sackville river	140	947

NOTE:—It is proposed that Salmon falls and lake Holden branch on the Gold river should form a single development and also that the Indian and Northeast rivers should be combined in a single power-house at the head of Little Indian lake. For details of all these developments, see "Progress Report, Nova Scotia Water Power Commission, 1916".

It is intended to continue the hydrometric work and water-power investigations in Nova Scotia until at least all the more important rivers of the province have been investigated.

No. 9.

REPORT OF THE CHIEF ENGINEER OF RECLAMATION.

T. H. DUNN, O.L.S., M.Can. Soc. C.E.

Field operations were conducted in the following districts, viz:—

(1) Grand Rapids of the Saskatchewan.
(2) The Carrot river.
(3) Lake Winnipegosis.

In addition to the above an inspection of the Lake of the Woods was made during extreme high water.

One party was kept in the field under the immediate supervision of Mr. G. G. McEwen, B.A.Sc., from May 25 to October 23.

GRAND RAPIDS.

A topographical survey was made of the south bank of the Saskatchewan commencing at a point about midway of Grand rapids and extending upstream to a point above Red Rock rapids. The surface was contoured for a distance of from one to two miles from the river. The object of the survey was to secure sufficient information as to the surface elevation to permit the design of a dam for the development of power.

The district was reached by way of Pas and thence down the Saskatchewan river using a launch as far as the "Narrows" and canoes for the remainder of the trip. Work was commenced about the middle of June and continued for nearly four weeks. On the completion of the survey the party returned to Pas, where they arrived on July 15.

THE CARROT RIVER.

Work was commenced in this district about the middle of July and continued for seven weeks. At first fair progress was made in spite of the extreme height of the flood but the difficulty of getting axemen and other help to work in the water soon became serious and the survey had to be stopped altogether on this account.

The flood of 1915 was the highest recorded up to that time since gauging was started at Pas. The extreme height reached by the water in that year was 859·81 Public Works datum. The flood of 1916 was still higher and reached an extreme elevation of 860·38. This constitutes a record so far as government records go but there are evidences of the water having been higher at some earlier period. The information gained during the past season has introduced new data, the effect of which has been to materially alter the design previously suggested for the reclamation of the Carrot River triangle.

The flood of 1916 was extraordinary at least in so far as the Carrot river is concerned, because of the fact that the extreme conditions on the Saskatchewan combined with a very unusual flood on the Carrot, due to heavy rainfall in the Carrot River valley, caused the banks of the Carrot to overflow from its outlet to a point about four miles below the mouth of the Sipanok. At and near the mouth of the Sipanok the bank was only about one foot above the water while about twelve miles above the mouth of the Sipanok there is a small side channel leading from the Carrot to

the Sipanok entering at a point a few miles from its mouth. The banks of the Sipanok were also more or less flooded to the head of the first portage about eleven miles from its mouth. There was also increased flooding in 1916 along the south bank of the Saskatchewan. In the year 1915 the south bank of the Saskatchewan flooded only as far west as the Second Meridian but in 1916 it was also flooded for about seven miles across range 3, from the mouth of the Bigstone river west, and for about 15 miles across range 7 and a portion of range 6, from the head of the Cumberland Lake cut-off eastward.

The work of the season was a continuation of that planned and started in 1915, viz.: The running of a series of four north-and-south level lines across the flooded district from the Carrot river and Sipanok channel on the south to the Saskatchewan river on the north, the traverse and levelling of the Carrot river from its mouth to the mouth of the Sipanok channel and the cross-sectioning of the south bank of the Saskatchewan river at every bench mark established by the Department of Public Works from Pas up to the head of the Sipanok channel. During this season three lines were started from the Saskatchewan but none of these were completed. The first line was commenced about 18 miles west of the Second Meridian and was continued for $10\frac{1}{4}$ miles south from the Saskatchewan river. The second line was started about 31 miles west of the second meridian and was run south $7\frac{3}{4}$ miles. The third line was run $3\frac{1}{4}$ miles south from a point 41 miles west of the second meridian. If the three lines thus started are produced to the Sipanok it will require the opening up and levelling of about 27 miles of additional line.

So far as the district which has been called in these reports "The Carrot River triangle" has been explored it has been found to be, for the most part, low and wet with but few ridges of high land. In this respect it is somewhat disappointing since a fair percentage of high land so distributed as to be available for building purposes is of inestimable value in any scheme of reclamation by drainage.

Contrary to what has been previously supposed, the western portion of the flooded area is much flatter than the eastern portion. An examination of the profiles of the various cross lines shows that the only land having any tendency toward unevenness is that crossed by the second meridian and perhaps a very little in the extreme west end.

Along the second meridian there are three summits and two distinct depressions. At the north end of the line on the bank of the Saskatchewan the elevation is 877, at the south end on the bank of the Carrot it is about 873 and on the ridge a little north of the centre between these two rivers the maximum elevation is nearly 873. On each side of this central ridge there is a wide depression reaching to the Carrot on the south and to the Saskatchewan on the north. The north valley is traversed by the Birch river with its banks at elevation 863, while the south valley is traversed by a creek. In the south valley the average elevation of the ground is about 865. On the central ridge is located the Petabeck river, a branch of the Birch. From this it will be seen that the land on the meridian adjoining the Petabeck is about 10 feet higher than that adjoining the Birch and this represents almost the extreme difference of surface elevation along the second meridian. On this line the high water of 1915 in the Saskatchewan was 12 feet above the banks of the Birch while in 1916 it was 12·57 feet higher than the banks of the Birch.

On the next line to the west of the second meridian the elevation of the south bank of the Saskatchewan is 884. The surface drops down quickly to 875, from which it varies but little throughout the length of the line as far as run. There is a slight rise of about 3 feet for a very short distance at about 6 miles south, but south of this point the surface is level at about 872 to 873, is very wet and overgrown with willows.

On the second line west of the Second meridian the surface drops down from 895 on the south bank of the Saskatchewan to about 882 in the interior and is prac-

tically level at this elevation as far as the line runs. There is, however, a very slight rise and a very deep creek at the end of the line. The creek is without current and is believed to be identical with the one called Blind creek and thought to have been a side channel of the Saskatchewan at some former period.

The last line run is in the extreme west end and is only about 3¼ miles in length. The elevation at the bank of the Saskatchewan river is 901. It drops quickly to 896 but rises again about two miles south to 900 elevation, which continues to the end of the line.

From the information that has been obtained it is apparent that almost the whole of the interior of the Carrot River triangle lies considerably below high-water mark in the Saskatchewan for such years as 1915 and 1916. It is also apparent that, speaking generally, the slope of the whole district is eastward toward Saskeram lake but the fall is rather light. These two facts are alone sufficient to explain the conditions existing throughout the area, viz., a generally wet condition of the soil with complete flooding in the lower areas and in the eastern portion.

The comparatively high ground along the boundary rivers protects the western end from flooding in ordinary seasons, but the light surface slope and the absence of any very well-defined streams keeps the ground wet. The low banks at the east end, however, permit the flooding of the eastern portion to a considerable depth almost every year.

The question of extreme high-water mark is a very important one, and for this reason considerable attention has been paid to it and no opportunity for collecting information concerning extreme flood elevations has been neglected. In this connection it may be observed that high-water marks are plainly visible on the trees along the banks of the Sipanok channel at an elevation of about four feet above the banks. The real significance of the marks is not fully understood. They appear to indicate a flood of such extreme elevation as to turn the whole area from the head of the Sipanok channel to the Pasquia ridge and from the Pasquia hills to the north side of Cumberland lake into one immense lake. Under such conditions the Carrot River triangle would not be habitable as there would not be a single point of land above water in the whole area. It has been stated on good authority, however, that these high-water marks are not caused by the summer flood but by high water in the spring caused by an ice jam in the Saskatchewan river between the head of the Sipanok channel and the Cumberland lake cut-off. In the latter case it would not be serious, as the high water would last but a very short time, and the formation of an ice jam at this particular point is very unusual.

All the elevations given in the report of the Carrot River survey are referred to the assumed datum of the Department of Public Works. This datum is subject to a minus correction of 1·052 feet to bring it to sea-level datum according to the report of the Topographical Surveys Branch, 1916, by J. N. Wallace, D.L.S. On page 330 of this report the elevation of D.P.W. bench-mark 302 (formerly 79) is given as 865·635, while the elevation of the same bench-mark, referred to the assumed datum of the Department of Public Works, is 866·687. The elevation of this bench-mark referred to Hudson Bay railway datum is 839·01. The Water Power Branch gauge at the railway bridge at Pas is referred to this latter datum.

The information obtained in the year 1916 leads to the conclusion that a higher flood than that of the year 1915 should be provided for. Protection against such a flood, when augmented by an extraordinary rainfall in the Carrot River valley such as prevailed in the year 1916, requires not only the extension of the proposed embankment along the Saskatchewan river for some distance but also along the Carrot river to the mouth of the Sipanok channel and for a short distance along the Sipanok channel itself.

Under such extreme conditions it will also be necessary to provide a pumping plant of much greater capacity than previously planned owing to the fact that certain

areas that could be drained by gravity into the Carrot river under conditions similar to those prevailing in 1915 would, under conditions similar to those prevailing in 1916, have to be pumped. This additional plant and construction work would considerably increase the cost of the work but, nevertheless, the cost per acre would still be small and it is therefore advisable that the investigations be fully completed in order that construction may be commenced as soon as the demand for the land becomes sufficiently active.

LAKE WINNIPEGOSIS.

In the years 1914 and 1915 a short time was spent at the end of each season in examining Meadow portage and vicinity in order to secure information as to the cost of constructing a canal to lower lake Winnipegosis and at the same time to investigate the merits of two possible routes for such a canal. During the past season it was possible for the first time to make an examination of the shores of the lake in order to make a rough estimate of the area of low lying land adjoining the shore that would be directly benefited by lowering the lake. Estimates were made and published in former reports by the writer, but these estimates were based on such information as could be gleaned from township plans. Since, however, the township surveys did not extend north of township 41 any estimate based on them was necessarily very incomplete.

The work of 1916 was commenced on September 11 and continued for one month, during which time a reconnaissance of the northwest and west shores and a portion of the southeast shore was made. North of township 41 the land is unsurveyed and the location of the different points on the shore was fixed with reference to the physical features of the shore line and were marked on the map in their proper relative positions. The level was used in most cases to determine elevations and the contour of 6 feet above water level was taken as the boundary of the lands subject to overflow. Since the elevation of the lake at the time of the survey was 827, Water Power datum, the elevation of the limiting contour was 833. This would include all the land actually covered by water during periods of unusual floods but does not include all of the lands flooded at extreme high water. The elevation of the highest known water mark is 834.5. This is genuine water-mark, but nothing is known of the conditions existing at the time, and it may have been the result of a high wind blowing into the mouth of the Mossy river. It is known, however, that about sixteen years ago the water was very high all season and remained for a considerable time at a very high point where it left a well-defined mark, which is still plainly visible. This mark is at 834.11, Water Power datum, and represents the highest water within the memory of the result from lowering lake Winnipegosis.

The area of land below contour 833 is approximately 100,000 acres. This area would be damaged often, flooded occasionally, and at long intervals may be covered one foot in depth. This land is not at present sufficiently valuable to make the construction of a drainage canal at Meadow portage an economic proposition. As stated in a previous report, however, if worked out in conjunction with the development of power and navigation great benefits might be expected at inconsiderable cost. If also at the same time lake Manitoba be lowered but slight loss of head would result from lowering lake Winnipegosis.

LAKE OF THE WOODS.

During the unprecedented high water of July and August 1916 on the Lake of the Woods, an inspection was made in connection with the Lake of the Woods reference before the International Joint Commission, for the purpose of determining the effect of flooding on the lands and crops in particular and incidentally the general effect of the high water. Considerable time was spent on this work in company, during the

latter part of the season, with Mr. Hutcheon, Inspector of Surveys for the province of Ontario. Special attention was paid to the southwest shore of the lake, where there is considerable settlement and some lands under cultivation in addition to quite large areas of wild hay lands. All important cultivation areas adjoining the lake were visited as well as many districts, as yet uncultivated, where land is held by squatters or homesteaders. Most of the small streams running into the lake on the south and west can boast of one or more settlers and many of these streams were visited. Among those examined were Northwest Angle inlet and its three tributaries, Harrison, Poplar and Bear creeks, Stony creek, Willow and Zipple creeks, Big and Little Grassy and Rainy and Warroad rivers.

The northern part of the Lake of the Woods, being rocky and full of islands, has very little land suitable for agriculture along its shores. Small patches have been taken up at a few points but they are unimportant. The south part of the lake is a large body of open water with but few islands and low sandy or boggy shores. There is but little cultivated land adjoining the lake or its tributaries which is affected by high water and what there is is mainly located in the State of Minnesota. Owing to the late wet spring, the season was very unfavourable for grain and other crops except hay.